Water Supply Report:
Palomar Christian Conference Center
PLU 08-0094035

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EXECUTIVE SUMMARY

This report updates and replaces a water supply evaluation completed in 2000 for the Palomar Baptist Camp (currently named the Palomar Christian Conference Center [PCCC]); a 320-acre property located north and west of Palomar Mountain State Park, Palomar Mountain, San Diego County, California. The water supply evaluation was prepared in technical support of an application to expand the existing facilities and increase overnight accommodations. The previously-approved application stated that the project would annually require 19.6 acre-feet (Acft) of water and that monitoring and reporting of groundwater levels and groundwater production would be conducted by PCCC. Subsequent groundwater pumping data have shown that the previous water demands were underestimated. As a result, the PCCC submitted a Major Use Permit Modification ("Permit Modification"- Case P69-087W3; PLU 08-0094035).

The Permit Modification revises the groundwater extraction rate to 70 Acft per year. Pursuant to the Major Use Permit Modification application, the DPLU has requested that an updated groundwater investigation be conducted consistent with current DPLU guidelines and requirements to evaluate the significance of potential environmental impacts. This final report has been prepared to evaluate the potential water supply available to the PCCC and addresses the technical issues described in the DPLU's letter dated May 15, 2008 (**Appendix A**), DPLU comments dated May 7, 2008 on the Groundwater Investigation Report submitted March 27, 2009; and, DPLU comments dated July 22, 2009 based on a revised Groundwater Investigation Report dated June 22, 2009.

Most of the surface water that drains off of Palomar Mountain passes through the PCCC property because the headwaters of Pauma Creek are located on Palomar Mountain within and upstream of the PCCC property. A 2,854 acre portion of the 3,977 acre upper Pauma Creek watershed that discharges through the PCCC property was selected for the hydrologic study area. A sustainable yield estimate of 201 Acft/yr for groundwater is very conservatively presented herein for the subarea of the watershed. In contrast the combined onsite and offsite groundwater demand at full watershed build out is 104 AcFt/yr- significantly less than the sustainable yield. Current uses are expected to be significantly less and the primary off-site groundwater user in the project watershed is the State Park based on review of their water use records.

The yield estimate is judged to be very conservative because the groundwater storage in the basin has been intentionally underestimated due to a lack of offsite subsurface data. The depth of saturated alluvium is assumed to be 10 feet, and the depth of saturated decomposed rock is assumed to only be 20 feet- significantly less than the extent of DG observed in most of the onsite and offsite wells. It is likely that the amount of groundwater storage in the watershed is greater by a factor of 2 or more, and that the corresponding sustainable yield is also likely significantly higher.

The PCCC operates two production wells named Wells 3 and 5. The results of long-term constant rate discharge pumping tests of these wells supports a combined production rate of 50 gpm (80 Acft/yr), sufficient to produce the amount of water requested in the Permit Modification. However, a third well will be required in the future to provide back-up capacity. A parcel and well inventory for the area indicates that the nearest offsite production well a mile north-northeast of the PCCC boundary, on the other side of Doane Valley, and over 800 feet higher than the PCCC wells. Therefore, there are no expected interference effects related to existing or increased water well use by the PCCC. No groundwater dependent habitat was identified proximal to the PCCC's wells based on a study completed by Pacific Southwest Biological Services, Inc. (PSBS, 2009). Well 3 is located approximately 1000 feet from the perennial stream in Doane Valley. Comparison of streamflows with the maximum potential extraction rate of Well 3 shows that the rate of surface water flow significantly exceeds extraction rate. Well 5 is uphill of and hydraulically separate from Pauma Creek. Consequently, groundwater extraction is not anticipated to have significant impacts on biological resources in the areas of the production wells.

A review of current water use indicates that the proposed development will require a net groundwater demand of 36 Acft/yr after generating approximately 34 Acft/yr of return flows (80% of the estimated indoor water use). The 70 Acft/yr groundwater pumping demand is conservatively estimated to occur at full project build out and 100% guest occupancy. Potential water quality impacts related to septic system use are addressed separately by the PCCC as part of a response to the County of San Diego DEH for the Major Use Permit Application. The potential for offsite septic impacts is quite low due to the isolated location of the PCCC property coupled with the relatively high rainfall rates that occur.

The groundwater level and production monitoring program required as part of the terms of approval of the original application should be continued with a revised groundwater production requirement reflecting the updated annual water demand. Due to the proximity of a part of the proposed expansion to existing water supply Well 3, the location and design of wastewater piping and discharge systems should be carefully evaluated with respect to local soil and hydrologic conditions to avoid potential on-site water quality impacts.

1.0 INTRODUCTION

A water supply evaluation was previously conducted in 2000 for the Palomar Baptist Camp (currently named the Palomar Christian Conference Center [PCCC]); a 320-acre property located north and west of Palomar Mountain State Park, Palomar Mountain, San Diego County, California (**Figures 1 and 2**). The water supply evaluation was prepared in technical support of an application to expand the existing facilities and increase overnight accommodations. The County approved a Major Use Permit modification to expand and improve site facilities under DPLU case number is P69-087W1.

The previously-approved application stated that the project would annually require 19.6 acre-feet of water and that monitoring of groundwater levels and groundwater production would be conducted by PCCC. The anticipated annual water use of 19.6 acre-feet was much less than the estimated sustainable yield for the watershed. Based on the subsequent groundwater monitoring program and data provided to the DPLU by the PCCC it has been observed that post-expansion groundwater usage was significantly underestimated in the application. DPLU requirements for groundwater-dependent projects have also changed since 2000. Consequently, a Major Use Permit Modification was initiated in 2008 by the PCCC to expand the permitted groundwater use to 70 Acft/yr.

1.1 Purpose of the Report

The PCCC has resubmitted the project for approval under a Major Use Permit Modification with a revised water use requirement of 70 Aft/yr. As part of the application DPLU has requested an updated water supply evaluation be conducted (see **Appendix A**). This report has been prepared to evaluate the potential water supply available to the PCCC and to examine the significance of potential impacts associated with groundwater extraction. It addresses the following technical issues:

1) Evaluate the magnitude of existing and potential on- and off-site groundwater demands within the study area. Included in this evaluation is a record of water demand based on daily pumping records collected by PCCC in 2007, and water production records obtained from Palomar Mountain State Park. These records also include groundwater use required for fire abatement and control during the Poomacha wildfire that occurred in October 2007 (**Appendix B**).

2) Update the groundwater balance analysis using the DPLU rainfall data consistent with the data used to develop the current DPLU groundwater limitations map (**Section 3** of this report).

3) Assess the potential biological impacts associated with groundwater use. An updated biological resource assessment provided was conducted by Pacific Southwest Biological Services (PSBS, 2009) specific to the identification of groundwater-dependent habitat proximal to the water supply well locations.

4) Assess the potential impact of groundwater uses on off-site groundwater users (**Section 3** of this report).

5) Provide an updated description of the water supply wells including the results of 72-hour constant rate discharge tests completed on the two production wells in use by PCCC. (**Appendix D**).

6) Evaluate groundwater storage and potential changes in storage following current DPLU protocols and CEQA significance criteria (**Section 3** of this report).

1.2 Project Location and Description

The PCCC site is comprised of approximately 320 contiguous acres within the Cleveland National Forest on Palomar Mountain. Most of the site improvements are located on a ridge approximately 0.6 to 0.8 miles north of Boucher Hill in Palomar Mountain State Park, San Diego County, California. **Figures 1 and 2** show the general location of the project site. The maps show the location of the project site, the tributary watershed which includes most of Palomar Mountain State Park, Upper and Lower Doane Valley, and Upper and Lower French Valley. Included within the watershed are the headwaters to French, Doane, and Pauma Creeks.

All of the water from the upper Pauma Creek watershed flows through the PCCC property. The entire Pauma Creek watershed is shown in **Figure 2**. The area of investigation includes the 320-acre project site and the lower portion of the Cleveland National Forest watershed that drains onto the property. Given the relative size of the property, the analysis does not incorporate the entire watershed that drains from Palomar Mountain through the PCCC property. It is recognized that the groundwater and surface water watershed divides are not necessarily coincident; however, they are assumed to be the same for this analysis because the overall groundwater recharge and overall water balance is strongly controlled by the surface water watersheds.

The watershed depicted in **Figure 3** occupies much of the western portion of Palomar Mountain and includes the headwaters to Pauma Creek. There are three local surface water drainages that dominate the hydrologic setting. Each drainage occurs in areas of similar topographic relief likely related to regional fracturing and faulting of the granitic rock mass that comprises Palomar Mountain. All are tributary to Pauma Creek. These include:

Upper and Lower French Creek. These creeks convey water from the 1,123 acre upper Pauma Creek watershed outside of the project watershed. Both surface and groundwater inflows occur.

Lower Doane Creek, Upper Doane Creek, and Chimney Creek. These are located within the NW-SE trending valley in the center of the watershed. Baseflow in these creeks occurs as a result of groundwater discharge. The alluvium and decomposed granite (DG) within Doane Valley provides for significant groundwater storage to support baseflow.

Unnamed NW-SE trending drainage. Parallel to the Doane Valley drainage is a second, narrower drainage that crosses the southwestern portion of the PCCC property. Well 5 is located within this drainage. Baseflow is observed during average to above-average rainfall years within the lower portion of this drainage. Observations made by PCCC personnel support that year-long streamflows generally occur except during drought years.

From an overall water balance perspective, both surface water and groundwater flows into and out of the watershed. A quantitative assessment of the hydrologic water balance follows in **Section 3**.

1.3 Applicable Groundwater Regulations

The project is subject to the San Diego County Groundwater Ordinance (N.S. #9826). Since the project is proposing greater than 20 acre-feet of groundwater per year, it is considered a "water intensive use" by definition within the Ordinance. As such, Section 67.722.B. requires a groundwater investigation be conducted and that the following finding be made for the project: "*for a water intensive use, that groundwater resources are adequate to meet the groundwater demands of the project and the groundwater basin if it were developed to the maximum density and intensity permitted by the General Plan.*" Section 67.703 further requires for non-residential projects that well testing be conducted per procedures approved by the Director which are generally more extensive than those applicable for a residential well test.

The project is also subject to the County Guidelines for Determining Significance – Groundwater Resources. The following thresholds for determining significance are applicable to this project:

Water Balance Analysis: For proposed projects in fractured rock basins, a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50% or less as a result of groundwater extraction.

Well Interference (Fractured Rock Basins): As an initial screening tool, offsite well interference will be considered a significant impact if after a five year projection of drawdown, the results indicate a decrease in water level of 20 feet or more in the offsite wells. If site-specific data indicates water bearing fractures exist which substantiate an interval of more than 400 feet between the static water levels in each offsite well and the deepest major water bearing fracture in the well(s), a decrease in saturated thickness of 5% or more in the offsite wells would be considered a significant impact.

2.0 EXISTING CONDITIONS

2.1 Topographic Setting

Review of the topography shown in **Figures 1 and 3** shows that the site lies within a series of prominent NE-SW trending valleys that are roughly parallel with the SW flank of Palomar Mountain. The valley trends are consistent with the overall direction of the Elsinore Fault system. Elevations range from approximately 4,020 to 4,840 ft MSL within the PCCC property, and increase to over 5,600 ft MSL within the adjacent watershed.

2.2 Rainfall

The County of San Diego DPLU groundwater limitations map (http://www.co.san-diego.ca.us/dplu/docs/precip030104_small.pdf) provides contours depicting the average annual rainfall rates across the county and incorporates the effect of terrain and other factors to extrapolate the rainfall station data. The average annual precipitation for the Site is 33 to 35 inches per year as indicated in **Figure 4**, a map developed by the DPLU based on a 30-year rainfall period (1971 to 2001). Rainfall can vary significantly from year to year and in 'wet' years can be more than twice the average as can be seen in the imbedded graph shown in **Figure 4**. Similarly, 'dry' years can be less than half the long-term average.

Due to its elevation, the Site does experience freezing temperatures and winter snowfalls. All precipitation data are represented as equivalent rainfall.

Additional analysis of rainfall data follows in Section **3.1.2.4**. 34 years of historical precipitation data (1971-1972 through 2004- 2005 water years) were used on a monthly basis to estimate the magnitude and variation in groundwater recharge in conjunction with average monthly evapotranspiration rates.

2.3 Land Use and Offsite Water Demands

The contiguous portion of the 2,854-acre sub-watershed that recharges groundwater to the proposed development area is contained within a relatively undeveloped portion of the Cleveland National Forest and Palomar Mountain State Park http://www.parks.ca.gov/pages/637/files/palomarmountain2009.pdf). A GIS-based analysis of the property ownership records as included in the 2007 County of San Diego Tax Assessor data base was conducted (for a fee) by the County of San Diego GIS to assess current and potential future off-Site property use and groundwater demands. The parcels are shown in **Figure 5**, and a summary of the APN information is included in **Table 1**. Review of **Table 1** indicates that a large portion (approximately 75%) of the Pauma Creek sub-watershed used for this analysis is dominated by publicly-held forest and park lands. There are multiple off-Site parcels, labeled by APN, included within the Pauma Creek sub-watershed (**Figures 2 and 5**). These parcels, ownership, and their acreages are listed in **Table 1** and are sorted by ownership.

Privately-held off-site property water demands were reviewed on an individual basis and generally assumed to be developable with single family residences. Consistent with the current General Plan, it is estimated for water demand purposes that one single family residence (SFR) would be constructed per approximately 40 acres. Thus total of 28 potential privately-held parcels located on 656 acres of land is tabulated in **Table 1** with a water demand estimated at 0.5 Acft/SFR. Many of the parcels extend outside of the watershed, are 'land-locked', or include areas of steep topography and have a low likelihood of extensive development, so the estimate is viewed to be conservative.

The total potential groundwater use for the on- and off-site properties identified in **Figure 5** is summarized in **Table 2**. The State Park water demand is based on recent groundwater pumping records for their small water system as provided by park personnel (Mr. Randy Burt, per comm., 2009) and an estimate based on known water demands. The Palomar Mountain State Park includes an uninhabited lookout tower and communications facility at the peak of Boucher Hill, two public camping sites, and a park entrance/ headquarters, several private residences, and the Palomar Outdoor School. The Outdoor school is a year-round teaching facility operated by the County of San Diego schools that has a sixth-grade daytime student population of approximately 300 and 30 adult staff. It is served by the State Park water system. The school's sole outdoor water demands are associated with a swimming pool. Discussion with site personnel and site observations support that no landscape irrigation is conducted.

Table 1. APNs Within the Watershed

PUBLICLY-OWNED

APN	Acres	Ownership
11209016	120.21	UNITED STATES OF AMERICA(CLEVELAND NATIONAL FOREST)
11209017	80.00	UNITED STATES OF AMERICA(CLEVELAND NATIONAL FOREST)
11209020	339.59	UNITED STATES OF AMERICA
11216009	79.55	UNITED STATES OF AMERICA(CLEVELAND NATIONAL FOREST)
11216010	40.00	UNITED STATES OF AMERICA(CLEVELAND NATIONAL FOREST)
11216013	106.54	UNITED STATES OF AMERICA(CLEVELAND NATIONAL FOREST)
11216014	79.78	UNITED STATES OF AMERICA(CLEVELAND NATIONAL FOREST)
11216015	4.85	STATE OF CALIFORNIA PARK
11218011	356.70	UNITED STATES OF AMERICA(CLEVELAND NATIONAL FOREST)
13401003	38.68	UNITED STATES OF AMERICA
13401004	1.58	STATE OF CALIFORNIA
13401005	600.70	STATE OF CALIFORNIA PARK
13403014	120.00	STATE OF CALIFORNIA PARK
13403024	40.24	UNITED STATES OF AMERICA
13403025	40.21	UNITED STATES OF AMERICA
13412004	1.76	STATE OF CALIFORNIA
13412014	17.27	STATE OF CALIFORNIA
13413001	39.67	STATE OF CALIFORNIA
13413034	40.19	STATE OF CALIFORNIA PARK
13417028	4.43	COUNTY OF SAN DIEGO
acres:	2151.95	

PRIVATELY-OWNED

11216002	39.96	PALOMAR BAPTIST CAMP INC
11216003	119.99	PALOMAR BAPTIST CAMP
11216004	161.01	PALOMAR BAPTIST CAMP
acres:	320.96	

APNs with Current and Potential Single Family Residences

		Current	Potential	
11209003	120.00		3	BERGMAN CARL H REVOCABLE LIVING TRUST 10-26-89
11216001	79.91		2	BERGMAN CARL H REVOCABLE LIVING TRUST 10-26-89
11216007	39.75		1	HILL RANCH TRUST 12-31-92
11216008	14.91	1	1	MYERS R DEAN
11222019	11.57		1	THORNE KIP S&LINDA
13403007	118.00		3	BERGMAN CARL H
13412011	91.40		2	PHILLIPS VAN L LIVING TRUST 05-10-05
13412013	4.91	1	1	BROWN FREDERICK W <LE> STATE OF CALIFORNIA
13413042	40.84		1	WEIR FAMILY TRUST 10-09-95
13413101	21.82	1	1	CUNNINGHAM FAMILY TRUST 11-01-88
13413102	5.60	1	1	KELLOGG CLIFFORD&SUSAN TRUST 06-01-03
13413103	5.78	1	1	SHIELDS MICHAEL J&SHELLY LESLIE L
13413104	4.83	1	1	DAVIS ROY T III&TAMARA
13413105	6.88	1	1	WILLIAMSON PAUL T
13413107	6.50	1	1	STEARNS FAMILY 1994 TRUST 04-05-94
13413108	20.78		1	HAMERLY JAMES R&MARGARET F
13413110	14.17		1	WAITE REVOCABLE LIVING TRUST 03-06-04
13413111	8.80		1	BEISHLINE DANIEL H&MARCI
13413112	10.40		1	MCKINLEY WILLIAM C&HELEN J FAMILY TRUST 10-28-92
13413118	8.00		1	BURTON THOMAS W TR
13413119	8.00	1	1	BURTON THOMAS W TR
13417027	13.09	1	1	PHELPS FAMILY TRUST 06-30-88
acres:	655.94	10	28	Potential SFRs
			23.4	Acres/SFR General Plan Zoning: Minimum 40 Acres/SFR

3,129	*Total Acreage by APN*
2,854	Watershed Area
275	Acreage outside of Watershed (conservatively included for water demand)

There is an approximately 40-acre portion of land held by the Pauma Band of Luiseno Indians within the western side of the watershed. This land is part of their Mission Reserve and is currently undeveloped. It is wholly excluded from this analysis as a potential source of recharge or groundwater demand to respect their water rights.

Table 2. Estimated Potential Groundwater Pumping Demands.

Property	Description	Water Demand
Privately-held	10 existing SFRs 28 SFRs at full buildout	Current: 5 Acft/yr Future: 14 Acft/year (0.5 Acft/home net use)
Palomar Mountain State Park and Palomar Outdoor School (see feature locations in **Figure 3**)	Small water system supplies the Park and school. The total demand is supported by water production from 2 wells.	Current: 5.8 Acft/yr Future: 20 Acft/year (see **Appendix B**) (Note: allows for future expansion and fire demands-2008 demand was 5.8 Acft. No return flows are estimated)
PCCC	320 Acres, Groundwater Use Per Permit Modification	Current: 33 Acft/yr (Current Net: 22 Acft/yr) Future: 70 Acft/yr (Future Net: 36 Acft/yr) (see **Appendix B**)
Three Scenarios:	Existing Conditions: Existing with Proposed Project: Future with Proposed Project:	43.8 Acft/yr (net: 33.8 Acft/yr) 80.8 Acft/yr (net: 46.8 Acft/yr) 104 Acft/yr (net: 70 Acft/yr)

Based on a lack of extensive irrigated landscape observed in the State Park, it is likely that a significant percentage of the water use includes 'indoor uses' and would be discharged into septic systems. No return flows are included in the three groundwater demand scenarios for the State Park. Thus the total groundwater demand provides for a very conservative estimate of net groundwater use and allows for future increases in net groundwater use within the Park.

2.4 PCCC Water Demand

The Major Use Permit Application requests that the allowable water demand be increased to 70 Acft/yr. An analysis of the current groundwater demand has been developed based on data provided by the PCCC (**Appendix B**). Site water use for the last six months of 2007 was approximately 16.5 Acft, including water used for fire fighting during the Poomacha wildfire. The data support an estimated annual demand of approximately 33 Acft/yr for 2007 Site uses and activities. Thus the Permit Modification request of 70 Acft/yr represents an approximate doubling of groundwater use by the PCCC to allow for higher guest water use rates than assumed in the previously-approved facility expansion.

2.5 Geology and Soils

The project site and contiguous watershed site are underlain entirely within the granitic crystalline rock terrain. Palomar Mountain is part of the Peninsula Range Province, characterized by northwest trending mountain ranges, which are often bounded by major active fault zones. South of the site is the northwest/southeast trending Elsinore Fault zone located along the southwest face of Palomar Mountain. Doane Valley, located in the adjacent State Park, and the drainage located on the southern part of the Site, are prominent topographic features that have similar northwest-southeast orientations (**Figure 3**).

The US Department of Agriculture's Natural Resources Conservation Service (NRCS, formerly known as the US Soil Conservation Service) maintains a digital library of soils maps for the area. (http://websoilsurvey.nrcs.usda.gov). **Figure 6** shows the surficial soils in the water supply watershed as mapped by the NRCS. All of these soils are derived from the in-place weathering of granitic rock. A summary of the soils types and acreages follows in **Table 3**. Soils at the project site were formed from weathering of crystalline rock and consist of well-drained, deep to moderately deep coarse sandy loams of the Crouch Series (NRCS cited above). As shown in **Table 3**, over 95% of the watershed consists of Crouch series soils. As described by the NRCS, these soils are used mainly for range, watershed, recreational areas, and habitat. Vegetation is chiefly semi-dense to open stands of timber, grass, and shrubs. Timber stands are primarily black oak, canyon live oak, Coulter pine, incense cedar, and Jeffrey pine.

Alluvial deposits (mapped as Lu, Loamy alluvium) occur in Doane Valley. Approximately 111 acres (4 %) are mapped as alluvium. The alluvium occurs within and along streambeds that typically contain perennial water. These sediments overly and are contiguous with weathered or fractured crystalline basement rock.

Specific to this report, review of the NRCS soils data base shows that the hydrologic characteristics of the soils in the watershed readily support groundwater recharge. All of the soils shown in **Figure 6** are characterized by the NRCS to have no potential for ponding and/or flooding with the exception of the loamy alluvial (LU) soils located within alluvial channels where high water levels are anticipated during major storm events. Field observations indicate that the watershed has limited outcroppings of granitic rock and has extensive development of soft loamy soils, even on steep slopes. Hillside soils are characterized as Group B soils having relatively good drainage characteristics despite the relatively steep topography (per the NRCS, Group B is defined as "Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.").

Table 3. NRCS Soils Units within the Watershed

Symbol	Soil Name and Description	Group	Acres	pct
CtE	Crouch coarse sandy loam, 5 to 30 percent slopes	B	161	5.6%
CtF	Crouch coarse sandy loam, 30 to 50 percent slopes	B	277	9.6%
CuG	Crouch rocky coarse sandy loam, 30 to 70 percent slopes	B	867	30.1%
CvG	Crouch stony fine sandy loam, 30 to 75 percent slopes	B	1448	50.3%
Lu	Loamy alluvial land	C	111	3.9%
SpE2	Sheephead rocky fine sandy loam, 9 to 30 percent slopes , eroded	C	16	0.5%
Totals for Area of Interest			2,880	100.0

Notes: Soils area extends outside of 2854 acre watershed
and includes the Pauma Indian Reservation
Area calculations done using NRCS web-based software

NRCS Definitions:

Group B. Soils having a moderate infiltration rate when thoroughly wet.
These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture.
These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet.
These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture.
These soils have a slow rate of water transmission.

The drainage channel at the confluence of Doane and French Creeks carries stormwater discharge from over 3,000 acres of land, yet is fairly narrow and does not appear based on field inspection to have experienced extensive erosion or sediment. Portions of the channel bottom include schistose rock that is resistant to weathering. The limited channel development suggests that the watershed soils provide for rapid rainfall recharge and relatively low runoff rates, consistent with their hydrologic group rating.

2.6 Hydrogeologic Units

Boring logs were obtained from the State Department of Water Resources for the on-site wells, and the DPLU provided logs for six off-site wells (**Appendix C; Table 4**). Groundwater storage and flow in these wells is dependent on the primary porosity permeability in the decomposed weathered bedrock, and secondary permeability in fractures and joints in the weathered and unweathered bedrock. None encountered alluvium.

The hydrogeologic units of the Site and watershed consist of the following:

Alluvium. The NRCS soils map (**Figure 6**) identifies alluvium within Doane Valley along Lower French Creek and Doane Creek. Based on the observed relative topography in the valley, it is estimated that the alluvium is on the order of 5 to 20 feet thick. Perennial surface water flows generally occur in the stream channels within the alluvial areas, so the alluvium provides for significant groundwater storage.

Decomposed Granite (DG). The estimated areal extent of DG of 538 acres is shown in **Figure 3**. Decomposed weathered bedrock (DG) is noted in site well logs as described below in areas located outside of the drainage channels, so the extent of saturated DG indicated in **Figure 3** is judged to be conservative. Field review of local outcrop indicates that the granitic rock mass that comprises the southwestern side of Palomar Mountain and the local watershed is highly fractured and deeply weathered. The least weathered rocks in outcrop are typically schistose metamorphic rocks that appear to have been included within the granodiorite during emplacement. The schistose rock is generally less weathered and resistant to erosion, but comprises a small percent of the overall rock mass.

The shallow DG within the stream valleys mapped in **Figure 3** is expected to be saturated and occur under unconfined aquifer conditions. The depth of saturated DG is expected to be on the order of 10 to 60 feet, based on review of the depth of DG reported from on-site wells as further described below and field observations of limited rock outcrop in some of the steeper stream channels. Given the regional extent of the lineaments that are parallel to the Elsinore Fault and form the local valleys, it is anticipated that extensive fracturing and weathering occurs throughout the watershed.

Driller's observations can be summarized as follows for the PCCC wells. DG was noted in Well 2 to a depth of 59 feet, in Well 3 to a depth of 52 feet, in Well 4 to a depth of 54 feet, and in Well 5 to depth of 63 feet (**Appendix C**). The log for Well 4 notes 'softer,

almost schist' occurring from 82 to 105 ft bgs underlying a 'granite gneiss' that could be interpreted to be DG. Extensive fracturing/fracture zones were reported to occur at depth in all of the wells. In some cases water production rates were reported specific to fracture intervals. Water levels reported in all wells at the time of completion varied from above ground surface (artesian flow in Well 5) to 85 ft bgs in Well 3.

Well logs from off-site wells were provided by the DPLU and are summarized in **Table 4**. Extensive DG was encountered in most of the wells, and the rock was noted to be highly weathered to depths of over 100 feet in four of the six logs. Reported flow rates were fairly high with three of the wells reported to have production rates of at least 50 gpm.

Granitic Bedrock. The crystalline bedrock is predominantly composed of granodiorite and schist. It is extensively fractured, as evidenced by regional lineaments that trend both NW-SE and NE-SW. Field observations indicate that limited rock outcrop occur, extensively developed soil occurs throughout the watershed, and the rock mass is extensively fractured and deeply weathered. Most driller's log report extensive fracturing to the total depth of drilling.

2.7 Hydrologic Inventory and Groundwater Levels

2.7.1 PCCC Well Inventory and Groundwater Levels

Five wells have been drilled to date at the project site (**Appendix C**). Two of these wells, Wells 1 and 2 have reportedly been removed from service and destroyed and a copy of the well destruction log for Well 1 is contained in **Appendix C**. All five reportedly produced useable quantities of water. Long-term constant discharge well tests were conducted on Wells 3 and 5 for this report (**Section 3.3**). The long-term steady-state yield is significantly less than the short-term estimates provided by an air lift well driller test or from short duration aquifer tests.

Well depths range between 205 and 468 feet deep. All of the water wells installed at the project site were reportedly completed in crystalline bedrock and do not have inner casings, well screens, or annular filter packs. **Table 4** provides a summary of known site well characteristics.

Table 4: On- and Offsite Well Description (Drillers Logs in Appendix C)

Site Well Number	Casing& Total Depth, (feet) (Install. Date)	Depth to Water (when installed) (feet)	Discharge,gpm Driller Estimate, (as tested)	DG, in ft bgs	Comments
Onsite					
1 (#745241) (destroyed)	242 (unknown)	(unknown)	(unknown)	(unknown)	Near septic system, taken out of service 7/01
2 (#61869) (destroyed)	41.6 468 (8/13/71)	No Data	2.5 gpm	59 ft	Low Yield
3 (#01376) (active)	50 300 (11/14/76)	85	50 gpm (15; 72-hr test)	52 ft	Good quality water.
4 (#287660) (inactive)	60 365 (3/23/89)	79	50 gpm	54 ft, Possibly to 105	High Iron, Sulfur. Not connected to the water supply system.
5 (#479572) (active)	55 205 (7/19/91)	artesian	200+ gpm (35; 72-hr test)	63 ft	Artesian flow when inactive. 72-hr flow test maintained flow rate of 55 gpm.
Offsite					
463758	96 250 (4/19/95)	30	10	106 ft.	
463716	85 260 (4/4/95)	5	50 gpm	85 ft.	Weathered rock to 242 ft.
112-220-12	20 214 10/27/88	28	12 gpm	70 ft.	Weathered rock to 141+ ft.
134-130-46	50 437 6/30/87	234	50 gpm	84 ft.	Highly fractured. "sand" at 209 to 234 ft.
0903544	42 280 8/6/04	90	100 gpm	30 ft.	
479106	20 80 (11/22/91)	? artesian	1 gpm	"clay" noted to occur to a depth of 80 ft.	"Spring Dev." Noted in the well log.

Note: Wells 3 and 5 subjected to 72-hour constant rate discharge test as described in **Section 3.3**. The rates shown in parentheses are the estimated long-term production rates from the tests.

Well completion reports are available for the wells listed in **Table 4** and are presented in **Appendix C.** Wells 3, 4, and 5 all have excellent yields for a fractured crystalline bedrock aquifer. In these three wells, depths to groundwater have been reported to be between zero (for artesian well 5) and 85 feet below ground surface (bgs) in the well completion reports.

2.7.2 Off-Site Hydrologic Inventory and Groundwater Levels

Interviews with State Park personnel indicate that the State Park's small water system is based on two supply wells located in the SE portion of the Park (see **Figure 3**). These wells provide water to the Park and to the Palomar Outdoor School via a system of reservoirs and pipeline. Water production from these wells is summarized in **Section 2.3**.

At is inception, the Park initially relied on springs located in upper Doane Valley. These springs discharge from the hillside and support water flow within Doane Creek. Wells were subsequently installed for the water supply. The Park maintains a small pond, named Doane Pond (shown in **Figure 3**) supported by water flows from the upper Doane Valley springs (Jeff Lee, per comm., 2008).

2.8 Water Quality

Wells 3 and 5 are part of the PCCC's small water system and are regularly tested and reported in accordance with requirements of the County of San Diego Department of Environmental Health (LSWS #381982). The drinking water is of excellent quality. Representative water quality data available for site wells were provided in the prior water supply report. Chemical analyses for general minerals and metals conducted on Well 5 in April 1997 indicate a total dissolved solids concentration of only 114 milligrams per liter (mg/L), which is very low and indicative of the reason for the commercial use of Palomar Mountain groundwater as bottled drinking water. The only concern is the concentration of manganese at 0.11 mg/L, above the State Drinking Water Maximum Contaminant Level (MCL) of 0.05 mg/L. The MCL for manganese is a "secondary" MCL and not a strictly enforceable water quality standard. Analysis of pesticides by EPA Method 508 indicates that all parameters were non-detect. However, the latter report does not specify the tested well, although it is assumed the tested well was the principal water supply well at the time, PCCC Well 5.

The prior records also include an analysis of nitrogen as nitrate and nitrite in well number 1, located near a septic system outflow. The historically reported concentration of nitrogen as nitrate is 118 mg/L, exceeding the MCL of 45 mg/L. This well was reportedly not used for site water supply at the time of sample collection, but was available to supplement non-drinking water and emergency applications. The well was taken out of service and properly destroyed in July 2001 in accordance with State and local requirements. A copy of the well destruction log is included in **Appendix C**.

2.8 Hydrologic Summary

Surface water flows are an important component to the overall hydrology of the project watershed. There are no gaging stations within the upper Pauma Creek watershed, so there are no data to support quantification of surface water flows within the drainages that comprise the watershed. **Table 5** qualitatively summarizes the hydrologic water balance in terms of surface water and groundwater.

Table 5. Surface Water and Groundwater Flows into and out of the Watershed

	Inflows	Outflows	Net Balance
Surface water streamflows, associated with storm events and short-term flood flows.	French Creek (1,123 acre watershed) that flows into Lower Doane Valley	Pauma Creek (3,977 acre watershed) that exits at the western edge of the PCCC property. (A net watershed area gain of 2,854 acres.)	Outflow > Inflow. Due to surface water accumulation and discharge in the watershed. Runoff rates are expected to be relatively low for low to moderate intensity rainfall due to extensive soil development. Most of the groundwater recharge from French Creek surface water is expected to occur within Lower French Valley.
Surface water stream flows, supported by groundwater discharge (baseflow).	Groundwater inflow to watershed	Groundwater discharge to surface water, and flow out of watershed. (some will recharge within the watershed)	Outflow > Inflow. Doane Valley and unmanned drainage baseflows are supported by groundwater discharge from within watershed. Groundwater from along French Creek may discharge as surface water within the watershed.
Groundwater flow: DG/alluvium, and bedrock	Within the French Creek channel, and along the northeastern portion of the watershed	Within the Pauma Creek channel, and along the western watershed boundary	Likely similar in magnitude.

Overall, review of the watershed hydrologic conditions indicates that groundwater discharge to surface water provides for dry season baseflows that ultimately drain from the watershed towards Pauma Valley. There is expected to be some intra-basin transfer of groundwater as surface water from upper portions of the watershed can provide for groundwater recharge in lower portions of the watershed. A more quantitative evaluation of the overall watershed water balance follows in the next section.

3.0 WATER QUANTITY IMPACT ANALYSIS

This analysis of the long-term available water supply compares groundwater withdrawal rates to the amount of groundwater remaining in storage after groundwater recharge is calculated for the aquifer system based on historical rainfall data. The analysis, as summarized by **Figure 7** and in the Excel spreadsheet included in **Appendix E**, is based on a constant withdrawal rate for all groundwater users within the watershed. Many years the aquifer remains at or near full capacity since the Project withdrawal rate is a relatively small percentage of the total volume of groundwater in storage. When the aquifer is at 'capacity' no additional groundwater recharge occurs and the water is 'rejected' and accounted for in the water balance as surface water discharge from the watershed.

3.1 50% Reduction of Groundwater in Storage

Per DPLU guidelines and regulations cited in **Section 1.3**, one of the potential environmental impacts associated with the use of groundwater includes the excessive reduction in groundwater in subsurface storage due to groundwater extraction.

3.1.1 Guidelines for Determination of Significance

As described by the DPLU guidelines "*For proposed projects in fractured rock and sedimentary basins, groundwater impacts will be considered significant if a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50% or less as a results of groundwater extraction.*"

This report uses a water balance methodology as described in the following sections to determine whether a significant impact will occur due to the PCCC's proposed increase in groundwater use.

3.1.2 Methodology

The groundwater recharge rate is calculated for this analysis using a soil moisture balance methodology. The DPLU describes the water balance methodology as four steps (p.23 of the DPLU Guidance Manual dated March 19, 2007):

1. Calculate groundwater recharge on a yearly basis over a minimum 30-year time period.
2. Compare yearly recharge with proposed extraction and calculate the depletion of storage during those years when extraction exceeds recharge
3. Track cumulative depletion of storage during successive years of storage depletion
4. Determine if extraction is in excess of sustained yield if the cumulative depletion of storage exceeds the 50% capacity of the given basin. Here, the maximum sustainable extraction rate is calculated for the critical year where 50% of capacity occurs.

The groundwater storage is based on the interpretation of site-specific data and professional judgment. Incorporated into the water balance analysis are historical precipitation data, evapotranspiration rates, soil moisture capacity, and surface water runoff rates. Each of the water balance components are described in the following sections.

3.1.2.1 Groundwater Recharge

Groundwater recharge occurs across the entire watershed and the recharge rate is areally-averaged based on known soil types and hydrologic properties. Enhanced recharge is likely to occur within stream and drainage channels, but the soil moisture balance methodology, further explained in **Section 3.1.2.4**, does not explicitly account for the concentration of recharge due to the accumulation of surface water runoff and localized recharge within the watershed.

Septic system return flows are estimated to be 80% of indoor water use. Septic systems can vary in terms of their relative recharge efficiency depending on the percolation characteristics of the soil and the system design. The relative efficiencies can range from approximately 80 to 95%, increasing with soil percolation rate (Huntley and Dansby, 1987). The recharge efficiency 'factor' also incorporates potential water system losses. In this case, there are no water used records differentiating indoor uses versus outdoor used and the relative contributions are estimated as explained in **Appendix B**. Therefore an assumed 80% recharge efficiency for indoor water use is used in this report to provide for potential losses and other water not directed to subsurface wastewater treatment systems.

3.1.2.2 Groundwater Demand

Table 2 provides a summary of potential groundwater demands within the watershed. The Permit Modification requests 70 Acft/yr, State Park uses are calculated to be approximately 20 Acft/yr, and potential development of privately-held parcels amounts to 28 Acft/yr.

In relative terms, the average annual rainfall of 33 to 35 inches/yr within the 2,854 acre watershed represents approximately 7,800 to 8,324 Acft of water. So the maximum total groundwater demand of 104 Acft/yr in the watershed represents roughly 1.25% of the average annual rainfall. The net maximum demand (70 Acft/yr) represents less than 0.9%.

3.1.2.3 Groundwater in Storage

Groundwater occurs within the void space of the granitic rock that comprises the aquifer, and within the overlying stream valley alluvium. Within unweathered crystalline rock the void space occurs solely within rock fractures. In decomposed granite (DG), the void space occurs in pore spaces created from the weathering of minerals as well as from rock fractures. Fracture zones in the DG are typically highly fractured and deeply weathered, and often contain clay and fine-grained rock.

The groundwater storage capacity of the aquifer system is defined as the ratio of the volume of water released from the aquifer to the volume of aquifer containing the water when water is withdrawn from the aquifer under pumping conditions or as a result of a decrease in water levels. The storage coefficient of an unconfined aquifer is termed the specific yield; for a confined aquifer the value is termed the specific storage. The fractured rock aquifer system may occur under a mix of confined and unconfined conditions, depending upon the character and extent of fracturing within the rock. Here the term storage coefficient is used to define the amount of extractable water available within the aquifer.

Typically the storage capacity of unweathered crystalline rock is quite low and ranges between 0.1 and 0.01 percent of the rock volume. A value of 0.01 percent (storage coefficient, $S = 1 \times 10^{-4}$) is generally accepted for similar analyses of crystalline rock with low fracture density, increasing to 0.1 percent ($S = 1 \times 10^{-3}$) for highly fractured bedrock. Field observations of rock outcrop within and nearby to the PCCC property and the occurrence of multiple regional and lineaments (fracture systems) across the watershed generally support that the crystalline rock at the Project site is highly fractured and deeply weathered.

Weathered granite (DG) has a much higher storage capacity than unweathered granite due to the development of intergranular porosity via mineral weathering. DG is an important element to the water balance and overall hydrology of this and similar watersheds. The hydraulic properties of DG were well-summarized by Davis and DeWiest (in the textbook Hydrogeology, 1966, p.320, John Wiley and Sons) where they note that "Effects of weathering may extend more than 300 feet in regions of intense weathering. Depths of weathering of 5 to 50 feet, however, are normally encountered. Hydrated minerals in weathered rock at the surface will form loose aggregates which have porosities in excess of 35 percent. The porosity decreases with depth to zones in which the original rock-forming minerals are only partly altered." They further state that the overall porosity is on the order of 2 to 10 percent at depth.

The storage coefficient values will locally vary across the site as a function of the degree of fracturing and weathering within the rock mass, so the values used herein represent volume averages. A storage coefficient of 5% (0.05) is used for DG, and an intermediate storage value of 0.05% (5×10^{-4}) is used for the underlying rock in this Report. Alluvium has an assumed storage coefficient of 10%. The extent of saturated DG expected to occur in the watershed shown in **Figure 3**.

Alluvium Storage (111 Acft). The NRCS map (**Figure 6**) indicates that 111 acres of alluvium (Lu) occurs within Doane Valley. It has a storage capacity of 111 Acft of water based on an average 10% storage coefficient and an average saturated thickness of 10 feet (i.e. varies from 0 to 20 feet from the sides of the valley).

DG Storage (538 Acft). The 538 acre sub-area of DG shown in **Figure 3**. It contains 807 Acft of water based on an average 5% storage coefficient and saturated

thickness of 20 feet (i.e. varies from 0 to 40 feet from the sides of the valley). It is likely given that the valleys are parallel with the Elsinore Fault that the extent of saturated DG is much greater than estimated. A conservative estimate is being used for this analysis since there are no available data.

Bedrock Storage (713.5 Acft). The calculation of the amount of water in storage within the unweathered rock assumes an average saturated thickness of 500 feet, an area of 2854 acres, and a storage coefficient of 0.05%. This evaluation assumes that wells up to 500 feet below the water table (or below the DG/bedrock interface where DG occurs) can be installed to provide groundwater from the underlying bedrock aquifer system. Wells drilled in excess of 1,000 feet in depth are increasingly becoming common in the area, and extensive fracturing has been observed at depth in site wells, so the assumed 500 foot saturated thickness for bedrock is conservative.

The total volume of groundwater in storage is calculated to be 1,362 Acft. In contrast, the Project production rate from the watershed is requested to be 70 Acft/year, approximately 5% of the total volume of groundwater in storage in the watershed and less than 1% of the volume associated with the average annual rainfall (7,800 to 8,324 Acft/yr) that occurs in the 2,854 acre watershed.

3.1.2.4 Long-term Groundwater Availability

Evapotranspiration Rate The evapotranspiration rate is the rate that plants and soil lose water to the atmosphere by normal plant respiration and soil drying. Climatic parameters such as temperature, cloud cover, and wind strongly affect hydrologic conditions. The overall effect of these parameters can be seen in the rate of evaporation and plant transpiration (termed evapotranspiration, or ET). The ET rate used in this study is based on a state-wide monitoring system known as CIMIS (www.cimis.water.ca.gov). The California Irrigation Management Information System (CIMIS) is a program in the Office of Water Use Efficiency (OWUE), California Department of Water Resources (DWR) that manages a network of over 120 automated weather stations in the state of California. CIMIS was developed in 1982 by the California Department of Water Resource and the University of California at Davis to assist California's irrigators to manage their water resources efficiently. The ET data published by CIMIS for Zone 9 were used for this report. The annual reference ET rate for Zone 9 is 55.14 inches/yr. For example, based on the reference ET rate, an irrigated turf will require about 4 1/2 Acft of water per acre per year.

Soil Moisture Capacity The soils within the watershed have been mapped on an aerial photograph and classified by the US Department of Agriculture as shown in **Figure 6**. The areas for each soil type in the watershed were calculated using the mapping software provided by the USDA on their website (http://websoilsurvey.nrcs.usda.gov). The hillsides of the watershed are predominantly Crouch Series sandy loams. The soils within the central portion of Doane Valley are mapped as Lu, Loamy alluvial land. **Table 6** summarizes the acreage of each of the soil types in the watershed together with the typical soil thicknesses and the soil moisture capacity for each soil type. A

calculation of the soil moisture capacity based on the maximum soil depths reported by the NRCS for each soil type is also included. A soil moisture capacity of 4.5 inches (the midpoint of 3.4 to 5.2 inches indicated in **Table 6**) is judged to be a reasonable value for soils in the watershed.

The soils within the most of the watershed are classified by the NRCS as "well-drained" and readily accept rainfall recharge. Field observations of the site and area support that despite the relatively slopes, runoff rates for low-intensity storms are expected to be low.

Soil Moisture Balance Recharge Calculations. A soil moisture balance methodology is used in this report to determine the rate of groundwater recharge. The overall water balance is determined on a monthly basis using historical rainfall data. Each month that rainfall occurs, recharge will occur if the amount of rainfall exceeds the soil moisture capacity, water lost to surface water runoff, and the amount of water consumed by plants and lost to evaporation and plant transpiration (termed potential evapotranspiration, or pET). Note that the pET rate primarily accounts for evaporation from soil since non-irrigated native plants tend to have very low ET rates.

The soil moisture balance equation written in terms of recharge for month i is given by:

$$Recharge_i = ppt_i - runoff_i - pET_i - (SM_i - SM_{i-1})$$

where:
ppt, is the rainfall in month i
pET, is the potential evapotranspiration rate in month i
SM, is the soil moisture in month i and previous month i-1
runoff, is the surface water runoff in month i as given by:

$$runoff_i = ppt_i * pct * (SM_{i-1}/SMcap)$$

where:
runoff, is the volume of runoff in month i
pct, the runoff coefficient,
is the assumed maximum percentage of rainfall runoff in month i
SM, is the soil moisture at the time of rainfall
(The antecedent moisture condition, previous month i-1)
SMcap, is the soil moisture capacity for the soil, a constant

All values herein are expressed in inches. Volumes are calculated based upon the area of consideration. An Excel spreadsheet developed for these calculations is attached to this report (**Appendix E**).

Recharge occurs when the precipitation exceeds runoff, evapotranspiration, and the soil moisture capacity. Water can be stored in the soil at an amount up to the soil moisture capacity. Each month the antecedent moisture condition is evaluated to determine if the

soil moisture capacity has already been met. If the soil is already at the soil moisture capacity, and the next month's rainfall exceeds the amount of water 'lost' by evapotranspiration and runoff, recharge will be immediate. Runoff in the soil moisture balance is calculated as a function of the preceding month's soil moisture condition and is a maximum when the soil is saturated. Here a runoff coefficient value of 30 percent is used for the watershed.

A long-term aquifer water balance is then calculated using the historical rainfall record based on the rate of recharge from the soil, the amount of water that can be stored in the aquifer, and the amount of water pumped from the aquifer on an annual basis. In any given year the volume of water in the aquifer will vary depending on the relative recharge rate and groundwater demand. If there is no pumping demand, there is no change in groundwater storage. Years with recharge in excess of the aquifer storage and groundwater use lead to a condition where the excess recharge is rejected. Conversely, following periods of low rainfall, continued depletion of groundwater from storage occurs.

Estimates of the amount of groundwater recharge were conducted using an Excel spreadsheet that calculates the soil moisture balance (and recharge) on a monthly basis between 1970 and 2006 using the equations explained above. (The calculation methodology follows that used by a FORTRAN program named Recharge2, written by Dr. David Huntley of San Diego State University and generally accepted for similar projects by the DPLU). The Excel spreadsheet printouts are included at the end of this Report in **Appendix E**.

The basis for the analysis includes the following:

1) Historical rainfall data from the Palomar Mountain, CA weather station and the DPLU groundwater limitations (rainfall) map.
2) Evapotranspiration rates obtained from CIMIS climate zone 9.
3) Estimates of the groundwater storage of the DG and underlying crystalline rock.
4) Soils data obtained from the US Department of Agriculture. An area-weighted average value of 4.5 inches is used for the soil moisture capacity in the water balance calculations (see **Table 6** and **Figure 6**).
5) A general description and field review of the upper Pauma Creek watershed within the Site and Doane Valley.

Figure 7 is based on a 2,854-acre watershed with a total groundwater storage capacity of approximately 1,362 Acft. It depicts the seasonal recharge, and groundwater withdrawal on an annual basis. It shows a multi-year period of approximately 5 years ending in 1990 when groundwater demand exceeds calculated recharge. "El Nino"-type rainfalls occurred with above average rainfall in 1990 (42.9 inches versus the average of 33 to 35 inches) and provided for complete recovery of the aquifer system. The rapid replenishment of the aquifer system highlights the importance of 'wet' years to the overall availability of water for this Project.

Table 6. Soil Moisture Capacities in the Watershed

Symbol	Soil Name and Description	Drainage Class	Acres	pct	Soil Moisture Capacity (inches) low	high
CtE	Crouch coarse sandy loam, 5 to 30 percent slopes	Well Drained	161	5.6%	3.5	5.5
CtF	Crouch coarse sandy loam, 30 to 50 percent slopes	Well Drained	277	9.6%	4	6
CuG	Crouch rocky coarse sandy loam, 30 to 70 percent slopes	Well Drained	867	30.1%	3.5	5.5
CvG	Crouch stony fine sandy loam, 30 to 75 percent slopes	Well Drained	1448	50.3%	3	4.5
Lu	Loamy alluvial land	Somewhat Poorly Drained	111	3.9%	6	9
SpE2	Sheephead rocky fine sandy loam, 9 to 30 percent slopes , eroded	Well Drained	16	0.5%	2	3
			2,880			
				avg	3.4	5.2

are recognized-excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the [NRCS] "Soil Survey Manual."

The change in groundwater storage is shown in **Figure 7** using a maximum average annual extraction rate of 201 Acft/yr that represents approximately 2.5% of the average annual rainfall in the watershed. (In contrast, the maximum groundwater extraction rate from the watershed is conservatively estimated to be 104 Acft/yr, approximately 1.25% of average annual rainfall). The water balance calculation consists of two sequential steps. First a water balance is conducted for soil where groundwater recharge is the water not used by plants, lost to the atmosphere as evaporation, or flows away as surface water runoff. The second step examines the amount of water in storage within the aquifer versus the amount of pumping and recharge. In the absence of pumping the aquifer remains 'full'. Thus the water balance does not explicitly incorporate groundwater discharge to local streams that support baseflows. When pumping (discharge) occurs, it is offset by available recharge. Should no recharge occur, or annual discharge exceeds recharge, the aquifer volume is depleted. Under the maximum pumping rate it is allowed to deplete to no more than 50% of its storage volume.

3.1.2.5 Assessment of the Overall Water Balance

The groundwater balance calculations include the assessment of surface water runoff, but do not explicitly account for groundwater discharge that supports stream baseflow. However, the second step of the calculations that examine the capacity of the aquifer relative to recharge indirectly allows for water that is not directly discharges as runoff. Thus the soil moisture water balance calculations explained in the previous sections are examined to determine whether they effectively combine groundwater discharge and surface water runoff as a 'loss' from the watershed, especially during 'wet' years when sustained baseflows are expected.

Table 7 summarizes the water balance depicted in **Figure 7** and relates the soil moisture water balance components (i.e. rainfall, rainfall recharge, calculated runoff, rejected recharge, and evapotranspiration) to the water balance. Each of the water balance components are quantified from the soil moisture water balance calculations in terms of average annual values over the calculation period. Review of **Table 7** shows

- Evapotranspiration is the primary way water leaves the watershed.
- Groundwater flows in and out of the basin are assumed similar in value. The amount of groundwater flow is small compared to surface water flows
- Rejected recharge is a significant portion of the water balance.
- The annual average values show a net inflow to the watershed. Groundwater storage will vary from year to year. Some years show losses, others gains. However these numbers are approximate and the net balances are subject to significant uncertainty.

Table 7. Hydrologic Water Balance (Acft/yr)

Inflow	Volume	Outflow	Volume	Notes
Rainfall (1) (2854 acres)	**8,180** (2,527 to 19,839)			(RF) Rainfall variability noted in Table 8.
		Evapotranspiration (ET)	**4,755** (2,508 to 7,060)	(ET) Calculated in SMB (Table 8).
Groundwater (GW)				
GW inflow (2) (upstream)	**290**	GW outflow (downstream)	**290**	GW flows in and out of the watershed are assumed similar in magnitude
		GW discharge (baseflow)	**1,777** (0 to 8,589)	(RR) Rejected Recharge from SMB used to approximate baseflow (Table 8).
($Q_{return\ flows}$)	**120** (3)	($Q_{pumping}$) GW Pumping (maximum value from water balance calculations)	**201**	(Q_{net}) Septic systems return GW to subsurface (3).
(R) GW Recharge			**349** (0 to 1,080)	(R) Recharge offsets pumping in SMB. SMB has no recharge without pumping. (Table 8).
Surface Water (SW)				
SW inflow (4) (upstream)	**519** (8 to 1,726)	SW outflow (downstream)	**1,298** (19 to 4,315)	(RO) Runoff Calculated in SMB
		ET loss from streams		Assumed to be part of overall ET
Baseflow-in		Baseflow-out		Outflow represented as RR, above.
Total:	**9,109**	Total:	**8,669**	Net: +440 (5)
Range:	2,945 to 21,525		3,582 to 20,789	Net: -637 to +736

Notes:
(1) 34.5 in/yr used in SMB.
(2) Based on an aquifer cross-section 530 ft by 4000 ft. 30 ft of DG (K= 10-2 cm/sec), 500 ft of bedrock (K= 10-5 cm/sec). A range of values is not presented since inflow and outflows are assumed to be approximately the same.

(3) 60% of groundwater assumed to be used for irrigation and 'lost' as ET.
(4) The total upstream watershed is 3,977 acres. Runoff from the upper 1,123 acres is estimated to be 40% of the runoff calculated for the 2,854 acre project watershed.
(5) The long-term average shows net input, primarily due to surface water inflows. Seasonally the net water balance varies and includes losses and gains.

A net zero balance does not necessarily occur each year due to expected changes in groundwater levels and thus changes in water volume related to groundwater storage. The aquifer system has a total estimated volume of 1,362 Acft, so a change of 201 Acft plausibly represents 15% of the amount of groundwater in storage. Other terms in the water balance that could impact the net balance include ET losses from water in streams and the difference in groundwater inflow versus outflow. No significant changes in surface water storage are anticipated since the streams are small and the only pond (Doane Pond) is fairly small and has a relatively constant water level.

Tables 8 and 9 provide a summary of the annual soil moisture and aquifer water balance calculations. Not all of the recharge calculated in the soil moisture water balance is accepted by the aquifer. Water that is termed rejected recharge is a significant portion of the water budget and can exceed the calculated runoff.

Table 8 provides a comparison of the water balance calculations for a range of potential development scenarios. The effect of groundwater use on the aquifer is assessed in terms of the amount of water used from subsurface storage. Both the average annual and minimum historical storage values are calculated for each scenario. Scenarios with estimated groundwater in storage at or below 50% at any time are considered to have potentially significant impacts to groundwater resources. The maximum groundwater demand scenario for the proposed project plus full development in the watershed results in a minimum storage value of 79%, much less than the 50% criterion.

Table 8. Water Balance Summary

Area	2,854 acres			
Maximum GW in Storage	1362.50 AcFt			
Average Annual Recharge	188 Acft/yr	(see note 1)		
Scenario	**Total Annual Demand, AcFt (2)**	**Net Annual Demand, AcFt**	**Average Groundwater in Storage, percent**	**Minimum Groundwater in Storage, percent**
Existing Conditions	43.8	33.8	99%	95%
Existing Conditions Plus Project	80.8	46.8	99%	93%
Current General Plan Buildout Plus Project (3)	104	70	98%	88%
Maximum Groundwater Demand	201	201	93%	50%

Notes:
1. The water balance methodology requires a groundwater demand as part of the water balance. The value used in this table is for an annual demand of 201 Acft/yr. Zero demand equates to zero net recharge in the absence of groundwater use.
2. The current total and net groundwater demands for the PCCC are 22 and 33 Acft/yr. The proposed project at full buildout will primarily have 'indoor' water use with total and net groundwater demands of 70 and 36 Acft/yr (see Appendix B, Table B-4).
3. The future scenario is based on a development density of 40 acres/dwelling unit. The Referral Map (previously called the General Plan 2020 map) has a similar development density and will result in a similar water demand.

Review of **Table 9** shows that rejected recharge typically occurs when rainfall is at or above the annual average of 33 to 35 inches. It is noteworthy that sustained stream baseflows are observed to occur within the PCCC property when rainfall occurs at or above average (Ken Morrish, per comm.).

Table 10 is intended to be a rough, order of magnitude comparison of the surface water flows used to examine whether the soil moisture balance calculations sufficiently allow for surface water flows.

Table 9. Annual Soil Moisture Water Balance

	Rainfall	ET	Runoff	Recharge	Rejected
avg, inches	34.39	19.99	5.46	1.47	7.47
avg, Acft	8,180	4,755	1,298	349	1,777
max	19,839	7,060	4,315	1,080	8,589
min	2,527	2,508	18.91	-	-
ft3/sec	11.30	6.57	1.79	0.48	2.45
max, in cfs			71.53		142.37
% of RF	100.0%	58.1%	15.9%	4.3%	21.7%

Year	Rainfall	ET	Runoff	Aquifer Recharge	Rejected Recharge
1971	18.13	14.03	0.12	3.12	0.85
1972	42.05	20.24	9.78	1.69	10.34
1973	18.75	17.24	1.50	0.00	0.00
1974	33.26	26.51	3.37	2.54	0.84
1975	27.24	18.94	2.71	1.69	3.90
1976	33.58	29.68	1.91	1.69	0.30
1977	74.56	24.12	18.14	1.69	30.61
1978	48.06	21.26	10.85	1.69	14.26
1979	63.51	23.69	9.97	1.69	28.16
1980	14.67	14.06	0.61	0.00	0.00
1981	16.77	15.58	1.20	0.00	0.00
1982	48.65	25.80	11.64	3.38	7.84
1983	23.07	18.81	1.58	1.69	1.00
1984	31.92	22.77	4.86	1.69	2.60
1985	20.96	18.25	1.54	1.18	0.00
1986	23.01	20.08	2.75	0.18	0.00
1987	22.14	20.51	1.63	0.00	0.00
1988	14.11	13.90	0.21	0.00	0.00
1989	19.58	17.19	2.04	0.35	0.00
1990	42.99	17.39	6.15	4.54	14.91
1991	34.66	21.95	6.19	1.69	4.83
1992	83.42	27.83	17.79	1.69	36.11
1993	28.30	19.98	3.56	1.69	3.07
1994	63.35	22.01	10.03	1.69	29.62
1995	27.00	16.73	5.58	1.69	3.00
1996	24.22	14.60	3.65	1.69	4.28
1997	61.45	29.24	15.23	1.69	15.28
1998	18.59	18.25	0.35	0.00	0.00
1999	24.48	16.92	2.15	2.54	2.87
2000	27.19	20.63	2.35	1.69	2.52
2001	10.63	10.55	0.08	0.00	0.00
2002	38.23	23.51	7.66	2.54	4.53
2003	15.01	14.30	0.71	0.00	0.00
2004	75.82	23.27	17.69	2.54	32.32

Table 10. Comparison of Pauma Creek Streamflow with Soil Moisture Balance Calculations

Data Source: USGS 11037701 PAUMA C NR PAUMA VALLEY CA (COMBINED) CA

									Monthly mean flows, in cfs												
Year		RF in/yr	USGS, avg cfs	USGS Flow, Acft/yr	Runoff, Acft/yr	RO/flow, in pct	RO+RR, Acft/yr	(RO+RR)/flow, in pct	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
1971	1972	18.1	0.89	633	29	5%	29	5%	0.318	0.146	0.123	0.318	0.419	3.35	1.61	1.35	0.929	0.878	0.737	0.458
1972	1973	42.1	3.77	2,691	2,326	86%	4,555	169%	0.084	0.069	0.145	0.257	0.621	1.36	2.93	7.59	20	7.78	3.25	1.14
1973	1974	18.7	1.89	1,346	357	27%	357	27%	0.31	0.196	0.213	0.251	0.726	0.831	5.79	2.01	5.83	4.3	1.57	0.597
1974	1975	33.3	2.53	1,804	800	44%	800	44%	0.2	0.13	0.167	0.706	0.424	0.809	0.915	1.81	8.33	11.3	3.85	1.67
1975	1976	27.2	1.49	1,063	645	61%	1,342	126%	0.546	0.167	0.165	0.239	0.555	0.812	0.703	4.66	3.94	3.58	1.8	0.699
1976	1977	33.6	1.23	876	454	52%	454	52%	0.254	0.145	1.03	0.491	0.634	0.837	2.89	1.15	1.32	1.37	3.45	1.15
1977	1978	74.6	15.18	10,839	4,315	40%	11,365	105%	0.267	0.399	0.256	0.248	0.272	1.97	23.8	38.5	75.4	27	11	3.05
1978	1979	48.1	11.99	8,561	2,581	30%	5,742	67%	1.33	0.867	1.37	0.799	3.12	6.45	12.2	20.4	59.1	24.7	9.23	4.3
1979	1980	63.5	24.77	17,685	2,372	13%	8,838	50%	2.2	1.22	0.667	1.54	1.55	1.86	36.1	137.1	69.3	21.5	16.5	7.67
1980	1981	14.7	3.38	2,411	145	6%	145	6%	3.49	2.53	2.4	2.66	2.74	2.31	3.13	5.18	7.08	4.2	3.15	1.65
1981									0.832	0.582	0.464									
	Average	**37.4**	**6.7**	4,791	1,402	**36%**	3,363	**65%**												

Notes:

RF, is rainfall

RO, is runoff

RR, is rejected recharge

The gaging station has limited records. Data from 1964 to 1981 were on file (http://waterdata.usgs.gov).

The project watershed comprises 4.45 mi^2 versus the 11 mi^2 watershed that drains to the USGS gaging station (approximately 40% of the watershed). It is located in the upper elevations of the watershed and does receive a higher percentage of rainfall. The flows from Pauma Creek have been converted from average monthly flow rates (in ft3/sec) to annual volumes since annual totals are presented. Direct comparison of the annual discharge rates shows that the calculated runoff the project watershed, represented as combined runoff and rejected recharge, varies from 5 to 126% of the overall flows from Pauma Creek. On average for the period of record where Pauma Creek flow data are available, the watershed flows are 65% of the total flows when both runoff and rejected recharge are considered. Review of **Tables 9 and 10** shows that the amount of water that comprises rejected recharge is significant, and typically occurs during 'wet years' when baseflows are expected to be significant. If rejected recharge is not included, the watershed contributes 36% of the total flows. By area, the project watershed represents approximately 40% of the overall watershed, so these values are similar in magnitude to the amount of surface water flow measured for Pauma Creek and are in relative proportion based on watershed areas. Further, the addition of the rejected recharge to surface water flows to approximate stream baseflow appears to be reasonable.

Overall, the water balance methodology provides for a reasonable approximation of the volumes of surface water flows from the watershed. Both runoff and rejected recharge are combined to account for streamflows. Although the intent of the soil moisture balance calculations is not to explicitly calculate surface water flows or groundwater discharge via stream baseflow, the resultant surface water volumes are relatively consistent with the results of surface water gaging conducted by the USGS for the 11 mi^2 Pauma Creek watershed.

3.1.3 Significance of Impacts Prior to Mitigation

Review of **Figure 7** shows that greater than a 50% reduction of groundwater in storage does not occur for a net groundwater extraction rate of 201 Acft/yr. Further, there are no known or potential groundwater-dependent biological habitat(s) nearby to site wells that would be affected by the PCCC's groundwater use as determined by a review by a DPLU-approved biologist (PSBS, 2009).

Well 3 is located near Doane Valley and Doane Valley Creek, the major tributary to Pauma Creek. The potential impact of groundwater pumping is evaluated by comparing the long-term pumping rate of Well 3 (15 gpm, equivalent to 0.033 cubic feet/second) with stream flows. The nearest gaging station data were obtained in Pauma Creek (See **Table 10**) downstream of the watershed evaluated in this report. The gaging station (shown in Figure 2) represents a watershed of 7,040 acres, of which approximately 60% drains through the PCCC property. The lowest average annual streamflow shown in **Table 10** is 0.89 cfs recorded 1971/1972. While the upper portions of the watershed have higher rainfall and likely to have higher sustained stream baseflow rates, the streamflow at the PCCC is conservatively estimated to be 60% of that recorded at the USGS gaging station. For the 'driest period' (1971/1972), the estimated streamflow would be 0.53 cfs (60% of 0.89 cfs). If operated continuously at 15 gpm, well 3 has a

flow rate of 0.033 cfs and will capture water in all directions from the well. The behavior of Well 3 during hydraulic testing is consistent with radial flow to a well from an aquifer system and not from a creek (i.e. a constant head boundary condition).

If it is very conservatively assumed that half of the water from the well is directly obtained (captured) from surface water, then the flow rate is equivalent to approximately 3% of the lowest average annual streamflow (0.0165 cfs/0.53 cfs, or 3.1%). The average annual flow rate is 6.7 cfs at the downstream gaging stations. Under these long-term average conditions, the potential impact is negligible (0.0165 cfs/4.02 cfs, or 0.4%). Overall, the operation of Well 3 is judged to have no significant impact on stream flow.

Well 5 is a 205-ft deep artesian well located 0.4 miles from Pauma Creek and more than 400 feet above the stream within a tributary drainage. The drawdown behavior (hydraulic response during pumping) of Well 5 does not suggest that it draws from surface water in that the water level continued to drop over the 72-hour test. A constant head boundary condition related to drainage of surface water would have cause the drawdown to stabilize. The artesian conditions support that the water entering the well is under pressure due to recharge occurring above the level of the wellhead. Thus given the relative elevation there is a very potential for direct interconnection of Well 5 with Pauma Creek. Further, since no groundwater dependent habitat was identified in the proximity of Well 5 (see Pacific Southwest Biological Report submitted as part of the Major Use Permit Modification Process) it is inferred that Well 5 occurs under confined conditions and has minimal interconnection with intermittent surface waters that flow within the adjacent tributary drainage.

3.1.4 Mitigation Measures and Design Considerations

No mitigation measures are proposed. It is recommended that groundwater monitoring be continued to verify that Project groundwater use does not exceed 70 Acft/yr.

3.1.5 Conclusions

The Permit Modification request for 70 Acft/yr is consistent with a groundwater extraction rate considered to have no significant impact per DPLU guidelines and regulations.

3.2 Groundwater Overdraft Conditions

There are no known groundwater overdraft conditions.

3.3 Well Testing

Per DPLU request (**Appendix A**), hydraulic testing of Wells 3 and 5 was conducted in 2008 to examine the long-term production capacity of each well in support of the Major Use Permit Modification. This section provides for an overview of the testing. **Appendix D** contains the test and test interpretation details. The results of the analysis are conservatively interpreted and support a 15 gpm long-term flow rate for well 3 and a 35 gpm long-term flow rate for well 5.

3.3.1 Guidelines for Determination of Significance

3.3.1.1 Well Interference in Fractured Rock

"*As an initial screening tool, offsite well interference will be considered a significant impact, if after a five year projection of drawdown, the results indicate a decrease in water level of 20 feet or more in the offsite wells. If site-specific data indicates water bearing fractures exist which substantiate an interval of more than 400 feet between the static water level in each well and the deepest major water bearing fracture in the well(s), a decrease in the saturated thickness of 5% or more in the offsite wells would be considered a significant impact.*"

The potential for well interference is very low since the nearest off-site well is located east-northeast of Well 3, one mile away and on the opposite side of Lower Doane Valley (see **Figure 3** for well locations). **Figure 8** has been prepared to show the site relative to the nearest off-site well. It is located over a mile away from Well 3 and is positioned 800 feet higher. Doane Valley contains a perennial stream and is located between the PCCC and the offsite well. Review of the physical setting supports that the potential for any measurable well interference effects is very low.

3.3.1.2 *Groundwater-Dependent Habitat*

There are no known or potential groundwater-dependent biological habitat(s) nearby to site wells that would be affected by the PCCC's groundwater use as determined by a review by a DPLU-approved biologist (PSBS, 2009).

There are no significant surface water impacts as evaluated in **Section 3.1.3**.

3.3.2 Methodology

Wells 3 and 5 were subjected to 72-hour constant discharge rate tests in accordance with a well test plan submitted for DPLU approval prior to the testing. A summary of the tests and test analyses is included in **Appendix D**.

3.3.3 Significance of Impacts Prior to Mitigation

There are no known significant impacts associated with groundwater production.

3.3.4 Mitigation Measures and Design Considerations

No mitigation measures are proposed specific to groundwater production.

3.3.5 Conclusions

The results of the water supply analysis, summarized in **Table 11**, support the PCCC's request to expand their groundwater pumping rate to 70 Acft/year as part of their Permit Modification Wells 3 and 5 are capable of supplying sufficient groundwater and groundwater withdrawals do not cause significant environmental impacts as defined by the DPLU's significance criteria However, both wells are needed to support the proposed project without any back-up capacity should either well fail

It is noteworthy that the annual aquifer water balance calculations indicate that the aquifer remains fully recharged for 23 of 33 years under the projected maximum pumping conditions (201 Acft/yr)

Table 11. Water Supply Analysis Summary

Component	
Watershed Area, acres	Analysis based on 2,854 acre sub-area of the 3,977 acre watershed
Production Wells	Two wells (#3 and #5) sufficient to meet Permit Modification request for 70 Acft/yr. Both wells are needed to support full project water demand.
Groundwater Storage, Acft (1062 acre sub-area)	1,362 Acft total: 111 Acft in alluvium (3.9% of area) 538 Acft in DG (19% of watershed area) 713.5 Acft from bedrock (avg. saturated thickness of 500 feet)
Rainfall	Average annual rainfall is 34.4 inches/yr (1970 to 2005) (8,181 Acft/yr over 2854 acres)
Soil Moisture Capacity	4.5 inches (**Table 6**)
Rainfall Recharge Rate	Average net annual recharge rate is 530 Acft/yr, 6.5% of rainfall for analysis period.
Project Groundwater Demand/ Required Well Capacities	70 Acft/yr Total/ 36 Acft/yr Net (~43.5 gpm)
Yield for Watershed, at maximum 50% reduction in groundwater storage (**Appendix E**)	201 Acft/yr
Long-term Well Pumping Rates (from 72-hour tests)	Well 3: ~15 gpm Well 5: ~35 gpm Total: 50 gpm/ 80 Acft/yr
Total demands within the watershed at full residential build-out. (Future State Park use is conservatively estimated to be 3 times the measured 2008 demand, and septic return flows are not included for either the Park or the PCCC)	104 Acft/yr Total/70 Acft/yr Net The total pumping rate represents ~7.6% of 1,362 Acft in storage, and ~1.25% of average annual rainfall)
Maximum Groundwater Depletion at maximum projected demand	88% for Net Demand (in 1989-1990; See **Figure 9**)
Years with no net Groundwater Depletion (for 201 Acft/yr extraction)	23 of 33 years (70%; See **Figure 9**)

4.0 WATER QUALITY IMPACT ANALYSIS

There are no known or anticipated water quality impacts associated with the extraction of groundwater. Groundwater uses includes irrigation, domestic and short-term occupant water use, and water use by and for horses. The small water supply system provides regular water quality reports to the County of San Diego Department of Environmental Health (LSWS# 381982).

A separate wastewater study is to be prepared for the project in accordance with Attachment E of the DPLU letter dated May 15, 2008 (**Appendix A**). It was done to address the requirements of the County of San Diego Department of Environmental Health (DEH) and outlines the current and proposed wastewater treatment systems. All of the wastewater treatment is understood to be handled by conventional septic systems.

Provided that sufficient setback distances are established, and the septic systems are properly maintained and remain functional, there are no expected direct impacts to PCCC production wells. Should additional production wells be planned, a review of the location of the current and future septic system locations should be conducted with the DEH to determine that sufficient distance is maintained between the well(s) and septic system to avoid water quality impacts.

Review of **Figures 1, 2 and 3** shows that the PCCC property is remote. The potential for offsite water quality impacts is very low since the nearest downgradient dwelling is located in Pauma Valley, approximately 5 miles from the western property boundary.

The potential for any significant water quality impacts associated with wastewater are represented by nitrates in groundwater will be separately addressed as part of the DEH review and approval process.

5.0 SUMMARY OF PROJECT IMPACTS AND MITIGATION

The project site is located in one of the most prolific areas of San Diego County relative to rainfall and groundwater availability. Rainfall and groundwater rates are relatively high, extensively well developed soils occur across the watershed, and the underlying bedrock provides significant groundwater storage since the rock is highly fractured and deeply weathered.

The Project's DPLU major use permit application requests that a net groundwater extraction 70 Acft/yr be allowed. A groundwater production capacity of 80 Acft/yr has been established based on hydraulic testing of two onsite production wells. The overall watershed is conservatively estimated to have a long-term sustainable yield of 201 Acft/yr without having significant impacts versus an estimated maximum future pumping demand of 104 Acft/yr for onsite and off-site groundwater use. The maximum net groundwater extraction rate is 70 Acft/yr, allowing for Project return flows.

A groundwater monitoring and mitigation plan is included as **Appendix F**. In simple terms the plan requires continued monitoring of groundwater production, water quality and groundwater levels. No groundwater sensitive habitats were identified proximal to wells 3 and 5, so there are no biologically-related monitoring or mitigation components to the plan.

6 0 REFERENCES

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Huntley, David and Dansby, David, 1987 Technical Report, Review of Subsurface Wastewater Disposal Policy, Appendix A, Numerical Modeling Investigation of Evaporative Discharge From Septic Systems, San Diego Regional Water Quality Control Board September 30, 1987

PSBS, 2009 Well Utilization Impact Assessment Biological Resources March 24, 2009, revised June 2009 Pacific Southwest Biological Resources (Prepared as part of the Permit Modification Package)

Tugrul, A , 2004 The effect of weathering on pore geometry and compressive strength of selected rock types from Turkey Engineering Geology 75, p 215-227

7.0 LIST OF PREPARERS

Jay W Jones Environmental Navigation Services, Inc

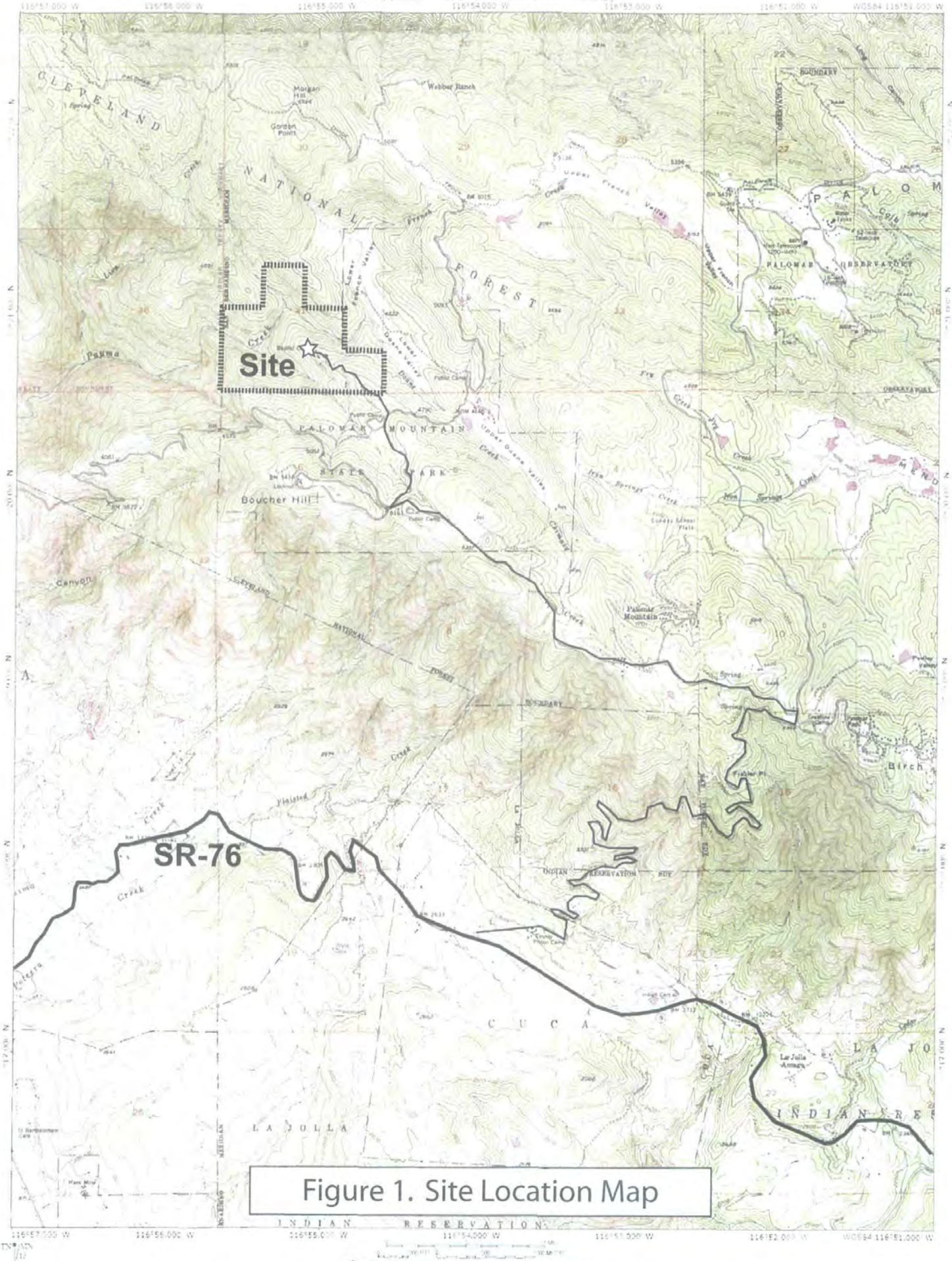


Figure 1. Site Location Map

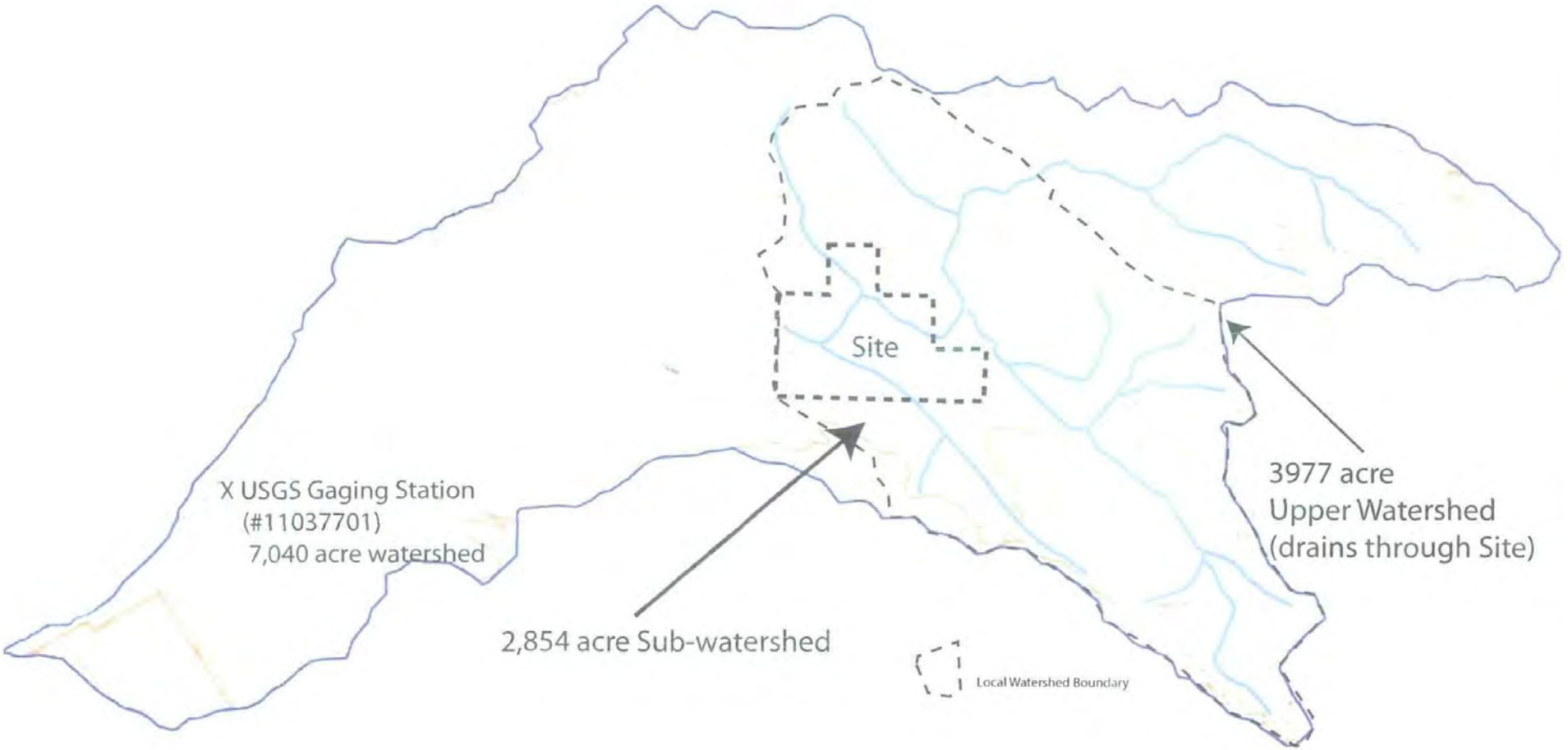
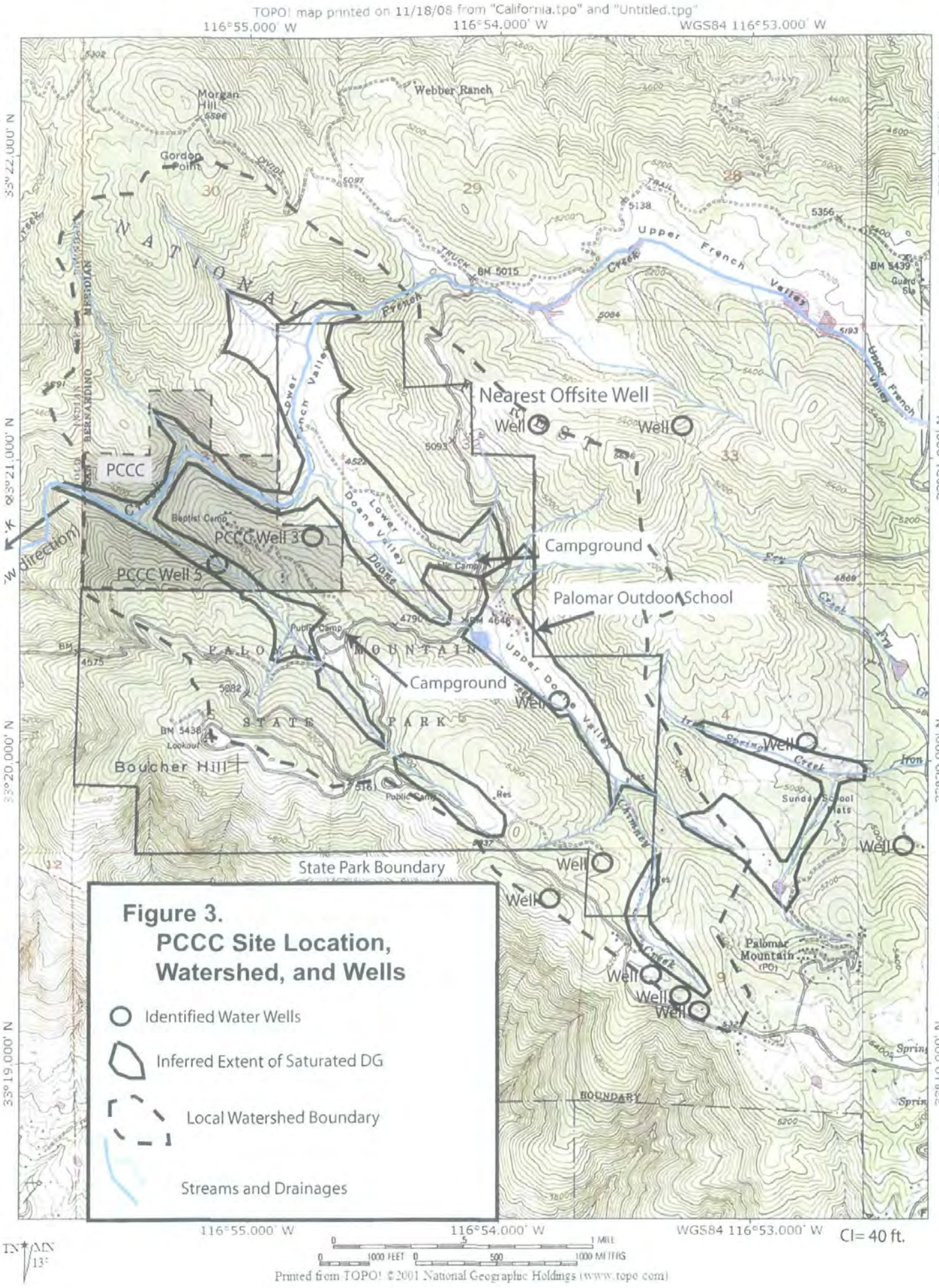


Figure 2. Watershed Boundaries

Palomar
Baptist Camp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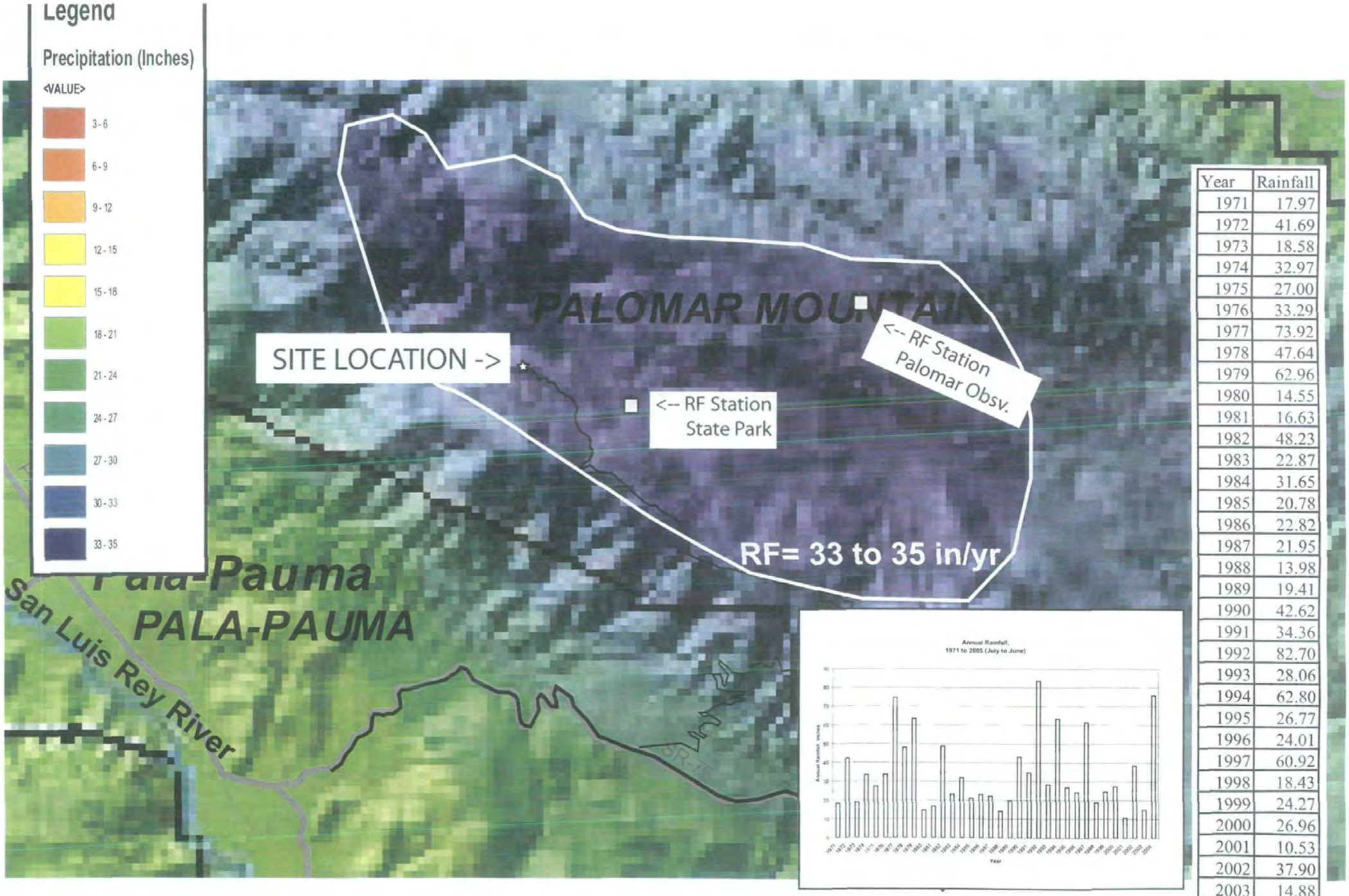
116°54.000' W
WGS84 116°53.000' W
33°22.000' N
33°21.000' N
33°20.000' N
33°19.000' N
Webber Ranch
Morgan Hill
5396
Gordon Point
5097
5138
5356
BM 5015
BM 5439
Guard Sta
Upper French Valley
Lower French Valley
Nearest Offsite Well
Well
PCCC
PCCC Well 3
PCCC Well 5
Campground
Palomar Outdoor School
Baptist Camp
Public Camp
BM 4646
4790
PALOMAR MOUNTAIN STATE PARK
Campground
5882
BM 5438
Lookout
Boucher Hill
5161
Res
Upper Doane Valley
Doane Valley
Iron Spring Creek
Sunday School Camp
State Park Boundary
Palomar Mountain (PO)
BOUNDARY
Spring
W direction
Figure 3.
PCCC Site Location, Watershed, and Wells
Identified Water Wells
Inferred Extent of Saturated DG
Local Watershed Boundary
Streams and Drainages
1 MILE
1000 FEET
500
1000 METERS
CI= 40 ft.
Printed from TOPO! ©2001 National Geographic Holdings (www.topo.com)



Year	Rainfall
1971	17.97
1972	41.69
1973	18.58
1974	32.97
1975	27.00
1976	33.29
1977	73.92
1978	47.64
1979	62.96
1980	14.55
1981	16.63
1982	48.23
1983	22.87
1984	31.65
1985	20.78
1986	22.82
1987	21.95
1988	13.98
1989	19.41
1990	42.62
1991	34.36
1992	82.70
1993	28.06
1994	62.80
1995	26.77
1996	24.01
1997	60.92
1998	18.43
1999	24.27
2000	26.96
2001	10.53
2002	37.90
2003	14.88
2004	75.16
avg	34.10

Figure 4. DPLU Groundwater Limitations (30 yr ppt) Map

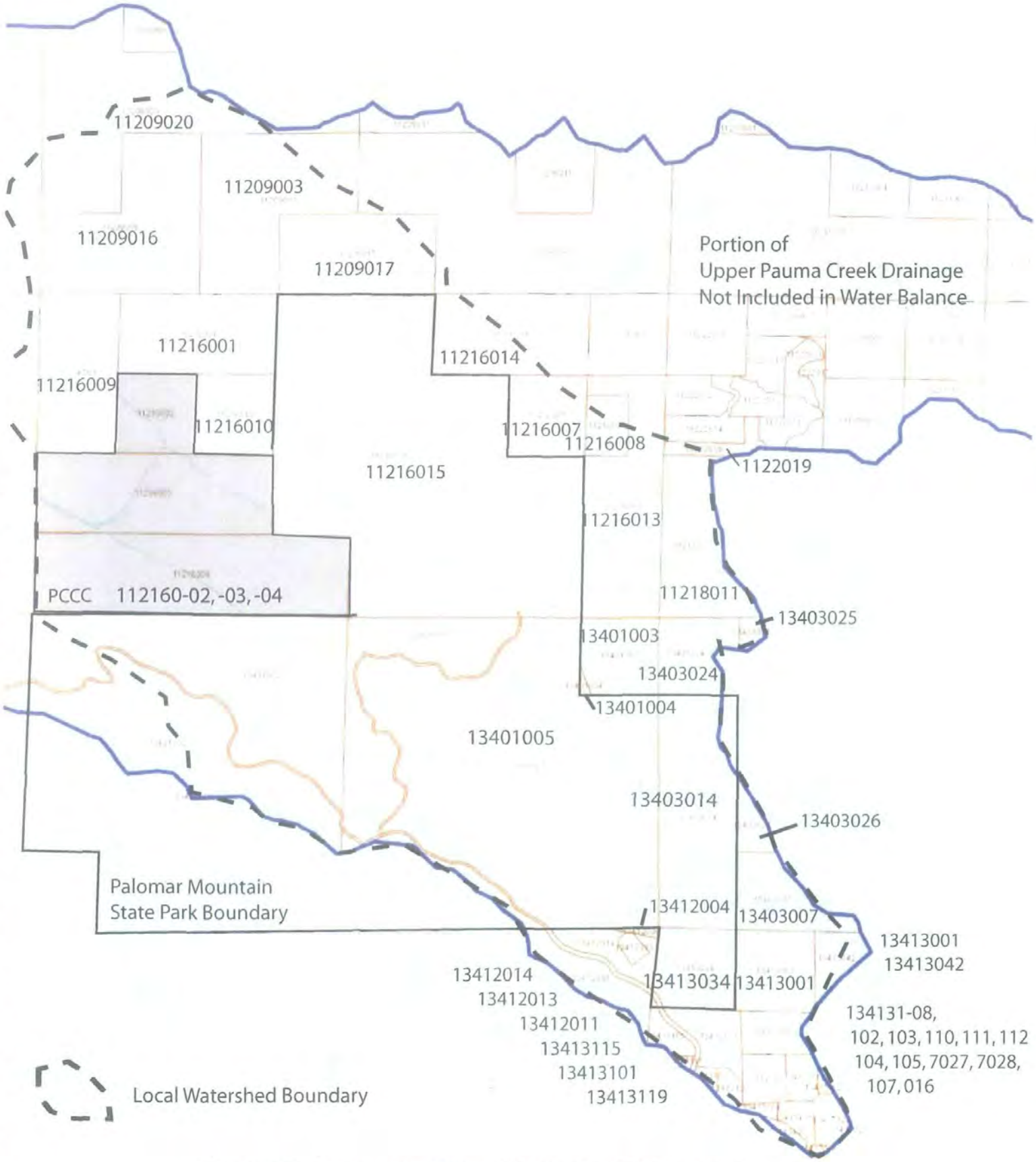


Figure 5. Assessor Parcel Map for Watershed

Soil Map
(PCCC watershed)

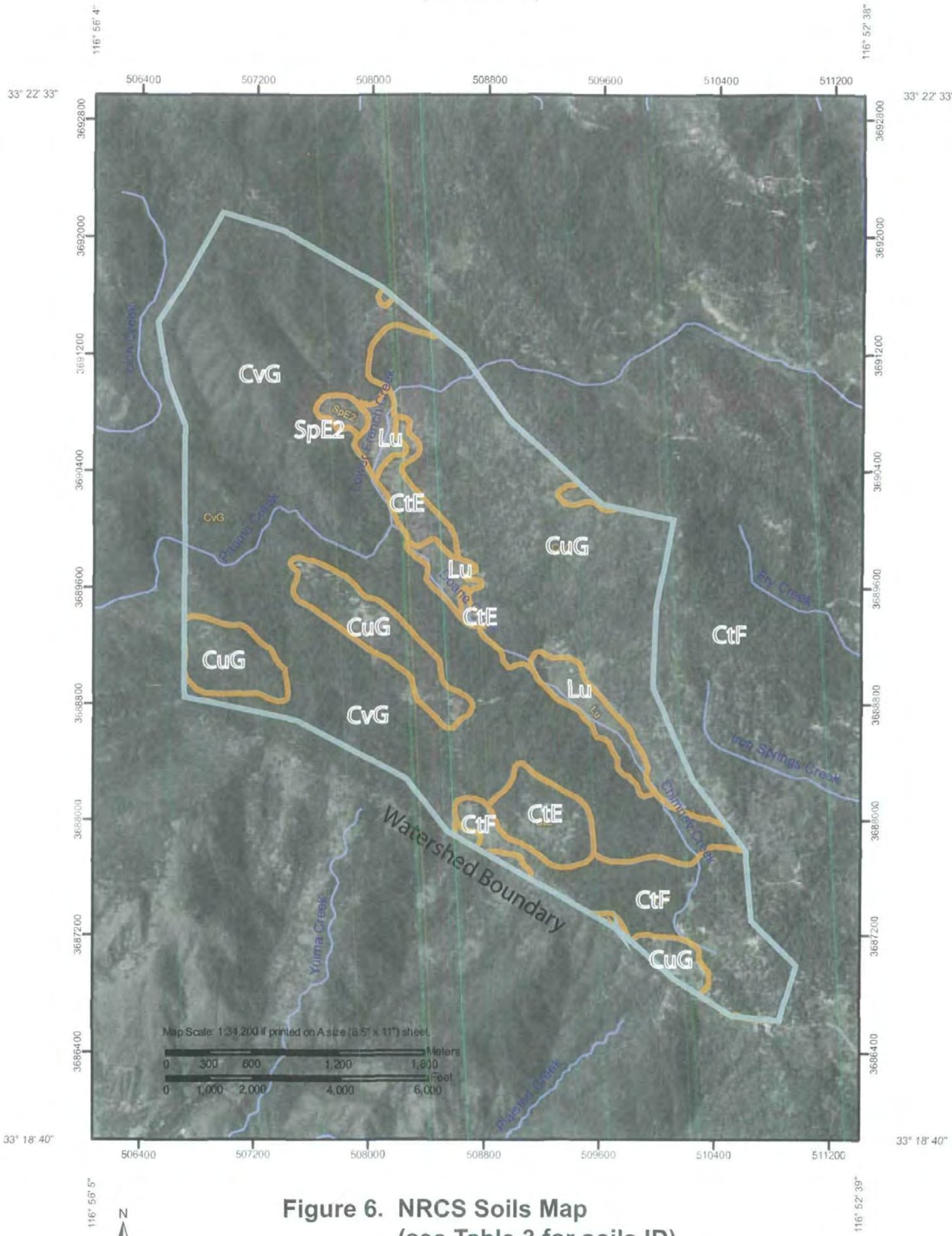
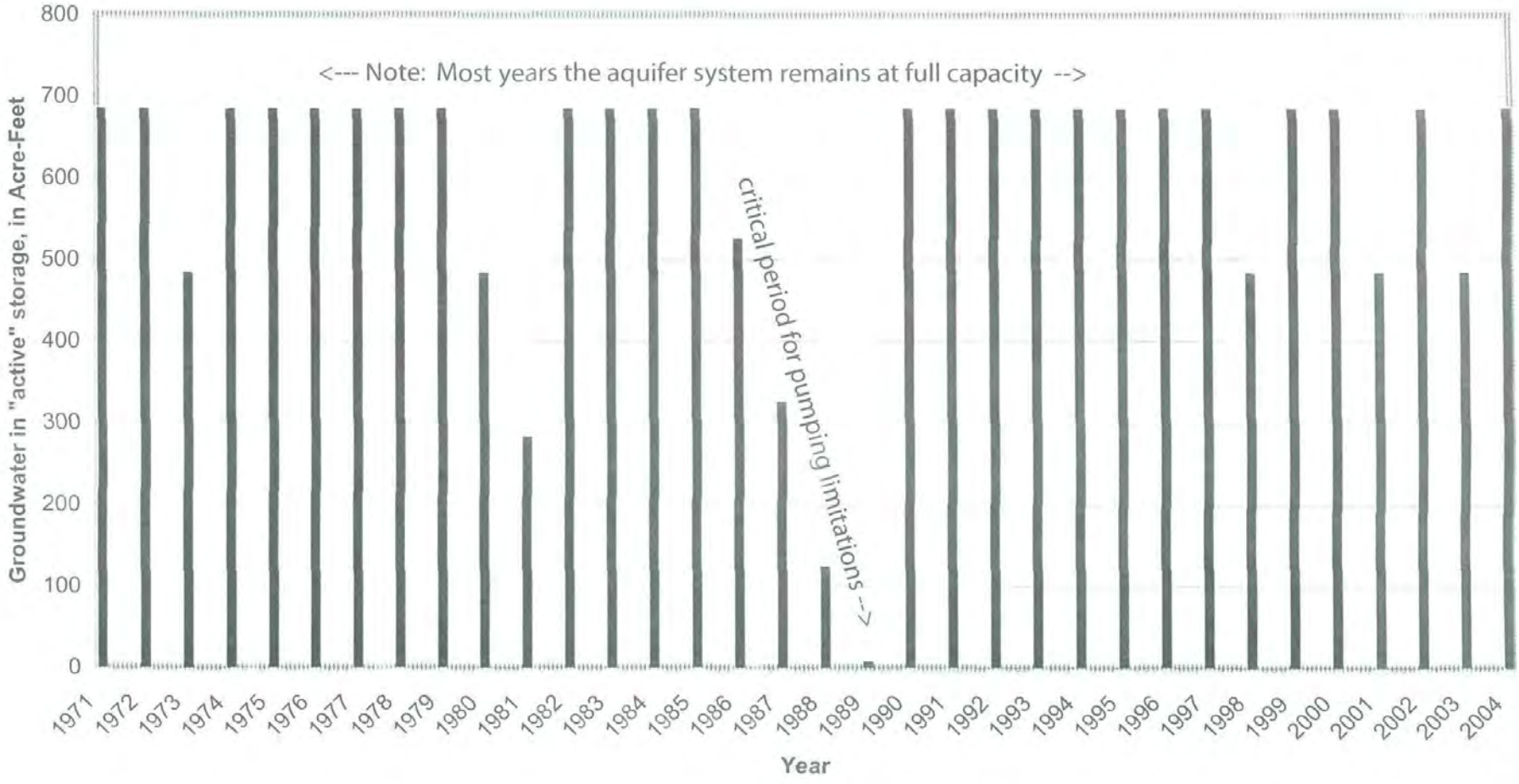


Figure 6. NRCS Soils Map
(see Table 3 for soils ID)

USDA Natural Resources Conservation Service

Web Soil Survey 2.1
National Cooperative Soil Survey

Figure 7
Water Balance, PCCC Water Supply
201 Acft/yr Groundwater Use (net)



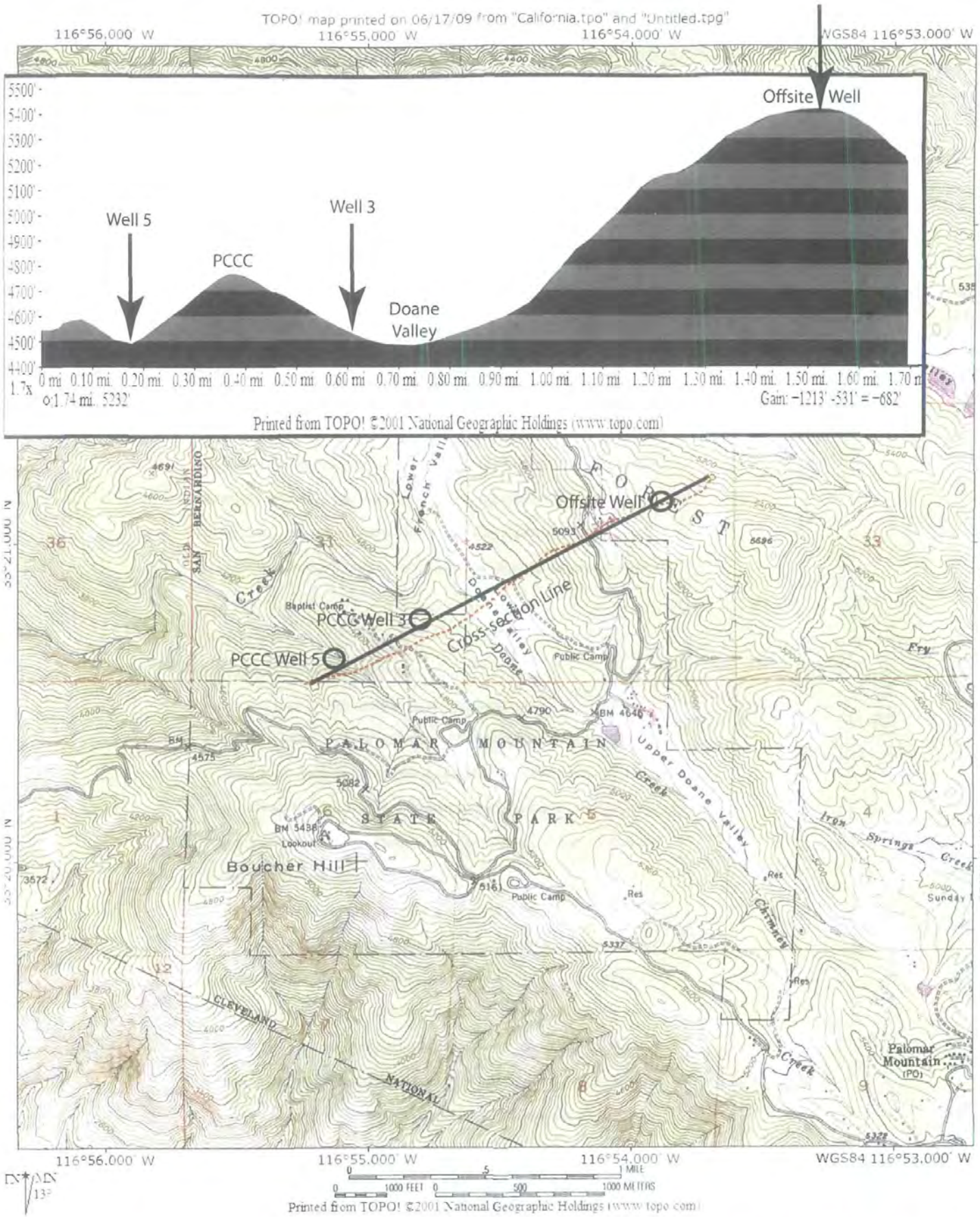


Figure 8. Elevation Cross-section from Site to nearest Off-site Well Note approximately 800-ft difference and position relative to the Perrenial Stream located in Doane Valley

APPENDIX A.
DPLU Permit Modification Letter dated May 15, 2008

ERIC GIBSON
INTERIM DIRECTOR

County of San Diego

DEPARTMENT OF PLANNING AND LAND USE

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May 15, 2008

Ken Morrish, Associate Director
Palomar Baptist Camp, Inc.
34764 Doane Valley Road
Palomar Mountain, CA 92060

CASE NUMBER: P69-087W3; ENVIRONMENTAL LOG NO.: 99-030-01B; PROJECT NAME: Palomar Baptist Camp Major Use Permit Modification for an increase in groundwater usage; PROJECT ADDRESS: 34764 Doane Valley Road in the North Mountain Subregional Plan area; APN 112-160-02, 03, 04; KIVA PROJECT: PLU 08-0094035

Dear Mr. Morrish:

The Department of Planning and Land Use (DPLU) has reviewed your application for a Major Use Permit Modification and is providing you with the attached package of information as a guide for further processing your application. This package consists of:

- Determination of Completeness pursuant to Section 65943 of the Government Code;
- Determination of Completeness pursuant to the California Environmental Quality Act (CEQA);
- A MATRIX which summarizes all the information we are requesting;
- Attachments which are detailed and provide you with very specific information on our request(s);
- A Memorandum of Understanding which must be executed by the applicant, the consultant and the County for each technical CEQA study requested;
- Preliminary comments from the Department of Public Works;
- Preliminary comments from the Department of Environmental Health;
- Preliminary comment from the Department of Parks and Recreation;
- An Environmental Cost Estimate; and,
- Estimated Processing Schedule

PROJECT DESCRIPTION

Below is the project description that staff has generated from the information provided in the application package and the Application for Environmental Initial Study (AEIS). Please review this project description and verify with staff that the project description is correct:

> The project is a Major Use Permit Modification to increase the previously approved usage of 20 acre feet of groundwater to a maximum of 70 acre feet per year. The project site is located at 34764 Doane Valley Road in the North Mountain Subregional Planning area, within unincorporated San Diego County. The site is subject to the General Plan Regional Category 1.4 RDA (Rural Development Area, Land Use Designation 23 (National Forest and State Parks) and is located within the Cleveland National Forest and subject to the Forest Conservation Initiative (FCI). Zoning for the site is A70 (Limited Agricultural) with a minimum lot size of 8 acres (FCI requires a minimum lot size of 40 acres). The site is developed with an existing facility that would be retained. Access would be provided by a driveway connecting to Doane Valley Road. The project is currently served by an existing on-site septic system and groundwater.

DETERMINATION OF COMPLETENESS PURSUANT TO SECTION 65943 OF THE GOVERNMENT CODE

DPLU has completed its initial review of your application and cannot find it complete pursuant to Section 65943 of the Government Code at this time. Please review the attached package of information which will detail how to further process your application.

DETERMINATION OF COMPLETENESS PURSUANT TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The Department of Planning and Land Use has completed its review of your AEIS and determined it not to be "complete" as defined by the CEQA. At this time, additional information will be required to determine your project's potential impacts on the environment and to complete the CEQA Environmental Initial Study.

These reports will be reviewed for technical accuracy and to determine whether a Negative Declaration or Environmental Impact Report will be necessary for your project. Additional copies of the final technical report(s) will be required when your project's environmental documents are circulated for public review. The reasons for this determination and the required information are detailed in the attachments to this letter.

CONSULTANT LIST & MEMORANDUM OF UNDERSTANDING (MOU)

The County of San Diego's CEQA guidelines require that environmental technical studies be prepared by a consultant from the County's CEQA Consultant List, which can be found on the County of San Diego's website at: http://www.sdcdplu.org/dplu/Resource/docs/3~pdf/consList.pdf. No list is maintained

for hydrology and stormwater management planning. With the exception of minor stormwater management plans, only registered engineers registered in the State of California shall be permitted to submit hydrology/drainage studies and only registered engineers or Certified Professionals in Storm Water Quality certified by CPESC, Inc., or an equivalent entity approved by the Director of Public Works, shall be permitted to submit stormwater management plans.

Applicants are responsible for selecting and direct contracting with specific consultants from the County's list to prepare CEQA documents for private projects. Prior to the first submittal of a CEQA document prepared by a listed consultant for a private project, the applicant, consultant, consultant's firm (if applicable) and County shall execute the attached Memorandum(s) of Understanding (MOU). The responsibilities of all parties involved in the preparation of environmental documents for the County (i.e. applicant, individual CEQA consultants/sub-consultants, consulting/sub-consultant firms, and County) are clearly established in the MOU for each requested applicable study. The clear identification of roles and responsibilities for all parties is intended to contribute to improved environmental document quality. The MOU can be found on the Department's website at: http://www.sdcounty.ca.gov/dplu/docs/MOU.doc

Technical studies must be prepared using the Guidelines for Determining Significance and Report Format & Content Requirements. The Guidelines and Report Format & Content Requirements can be found on the Department's website at http://www.sdcounty.ca.gov/dplu/Resource/3~procguid/3~procguid.html#guide.

PROJECT ISSUE RESOLUTION PROCESS: If you have disagreements with the requirements within this letter you should contact the project staff to resolve those issues. Upon discussion with project staff, you may have these issues referred to the Project Issue Resolution process to provide you with an opportunity to quickly and inexpensively have issues considered by senior County management. Issues considered under this procedure can include disagreements with staff interpretations of codes or ordinances, requests for additional information or studies, or disagreements regarding project related processing requirements.

Please contact me to learn more about this process, the limitations, or to request an application form.

ESTIMATED PROCESSING SCHEDULE: An estimated processing schedule is attached. Several assumptions were required to supply a schedule at this time and are listed at the bottom of the estimated schedule. If these assumptions prove to be incorrect, the schedule will be adjusted. The schedule also makes assumptions regarding County staff workload, submittal turnaround times by the applicant, and the number of iterations of submittals required for the applicant to obtain an adequate document. These assumptions are based on staff's experience with this type of case. **If reports are determined to be acceptable with less than three reviews or the applicant turnaround times shortened, the "standard" schedule can be reduced by as much as 50 percent in some cases.**

SUBMITTAL REQUIREMENTS: Unless other agreements have been made with County staff, you must submit all of the following items concurrently and by the submittal date listed below in order to make adequate progress and to minimize the time and costs in the processing of your application. The submittal must be made to the DPLU Zoning Counter at 5201 Ruffin Road, Suite B, San Diego, CA 92123-1666 and must include the following items:

a. **A COPY OF THIS LETTER.** The requested information will not be accepted unless accompanied by this letter.

b. *In addition to the documents requested below, electronic versions of these* documents / studies can be e-mailed directly to the Project Manager at Jarrett.Ramaiya@sdcounty.ca.gov. This will enable staff to make editorial strikeout / underline changes to electronic documents, ultimately saving time in the process.

c. The following information and/or document(s) with the requested number of copies as specified:

INFORMATION/DOCUMENT	# OF COPIES	LEAD REVIEW /SECTION or Dept.
Replacement Plot Plans * Plans must be folded to 8-1/2 x 11 maximum with the lower right hand corner exposed	16	PPCC for Distribution (please route 2 copies to DEH, 1 copy to biologist, 1 copy to Jim Bennett, and 1 copy to Pat Brown)
Biological Letter Report	3	J. Ramaiya (1), Monica Bilodeau (2)
Groundwater Investigation	5	J. Ramaiya (1), Jim Bennett, Groundwater Geologist (1), M. Bilodeau, Biologist (1), DEH (2)
Requested narrative by DEH	5	J. Ramaiya (1), Scott Weldon, DEH (1), Peter Neubauer, DEH (1), Jim Bennett (1), Monica Bilodeau (1)
Memorandums of Understanding according to Attachment B	Groundwater, Biology Subject Areas (1 Copy each)	J. Ramaiya (1 each)
The staff turnaround goal for review of the requested information/document is 30 days.		

*Please contact me in advance for a Special Handling Form if you wish to submit other documents not specifically listed above.

d. Deposits:

AGENCY	ACCOUNT NUMBER	DEPOSIT AMOUNT
DPLU-Planning	08-0094035	$2,989
DPLU-Environmental	08-0094035	$5,010
DEH		$1,008
DPR	9PMUPMOD1O	$133
TOTAL ADDITIONAL DEPOSITS		$9,140

The above is an estimate of the additional deposits required to process the application through hearing/decision.

Be aware that Section 362 of Article XX of the San Diego County Administrative Code, Schedule B, 5 states that:

> *The Director of Planning and Land Use may discontinue permit processing and/or recommend denial of the said project based on non-payment of the estimated deposit.*

Several assumptions were required to supply the DPLU-Environmental cost estimate at this time in the process. If these assumptions prove to be incorrect, your cost estimate will be adjusted. These assumptions are listed at the bottom of the attached environmental cost estimate.

Should your application be approved, there will be additional processing costs in the future (e.g., Final Map processing costs, park fees, drainage fees, building permit fees). The above estimate includes only the costs to get your present application(s) to hearing/decision and does not include these additional processing costs.

The initial review of your project indicates that there will be an effect on native biological resources. Therefore, State law requires the payment of a fee to the California Department of Fish and Game for their review of the project environmental document (Fish and Game Code §711.4). If this fee is needed, it will be requested and collected at a later time during the process. Payment of the fee is required regardless of whether or not we consider the effect on native biological resources to be significant or clearly mitigated. The Project Manager will remind you to pay this fee immediately prior to public review of the project environmental document.

SUBMITTAL DUE DATE: In order to maintain adequate progress and be consistent with the Estimated Processing Schedule (attached), DPLU recommends that all of the information requested in this letter be submitted by **September 12, 2008**. If you are unable to submit the requested information by the above date, please contact your DPLU Project Manager to submit a due date extension notification. Notification must

be submitted in writing and be signed and dated by the project applicant. The notification must include a revised submittal date and a brief rationale for the extension. Be aware if the submittal is deemed to be excessively late (generally six or more months), notifications are not received, or your project is excessively behind schedule the Department may make a recommendation for denial of your project to the appropriate decision-making authority based upon inadequate progress pursuant to CEQA Guidelines Section 15109.

If you have any questions regarding this letter or other aspects of your project, please contact me at (858) 694-3015.

Sincerely,

Jarrett Ramaiya, Project Manager
Regulatory Planning Division

cc: William J. Schwartz, Jr., Esq., Stephenson Worley Schwartz Garfield & Prairie, LLP, 401 "B" Street, Suite 2400, San Diego, CA 92101-4200
Kim Rosiar, Palomar Christian Conference Center, (P.O. Box 160), 34764 Doane Valley Road, Palomar Mountain, CA 92060
Pat Brown, Permit Compliance Coordinator, DPLU, M.S. O650
Nael Areigat, Project Manager, Department of Public Works, M.S. O336
Maryanne Vancio, Department of Parks and Recreation, M.S. O29
Brian Baca, Chief, Department of Planning and Land Use, M.S. O650
Donna Beddow, Planning Manager, Department of Planning and Land Use, M.S. O650

SCOPING LETTER MATRIX

Attachment	Item
A	Planning Issues
B	Memorandums of Understanding
C	Biology
D	Groundwater Resources
E	Department Of Environmental Health comments
F	Cultural Resources comments
G	Department of Public Works comments
H	Estimated Processing Schedule
I	DPLU-Environmental Cost Estimate

The Department of Planning and Land Use Fire Marshal has reviewed the proposed project and has no comments at this time. In addition, staff has received the submitted DPLU form # 399F that was reviewed and signed by Palomar Mountain Fire CSA.

The Department of Parks and Recreation has reviewed the proposed project and has no comments/conditions for this project.

ATTACHMENT A
PLANNING ISSUES

Plot Plan:

1. The submitted plot plan needs to incorporate the following revisions:

   a. The pagination states that the plot plan includes pages 1 through 11, yet the submitted plot plan only includes 3 pages. Please revise pagination.

   b. On pages 2 and 3, in the Building Legend, please incorporate the square footage for each approved structure. Please include a tabulation of the total approved square footage on-site.

   c. The previously approved Major Use Permit modification (P69-087W1/ER99-03-001) required a 100 foot setback from the Palomar Mountain State Park boundary for the northern portion of the development area. Please show the setback location on pages 2 and 3 of the plot plan and label accordingly.

   d. The previously approved Major Use Permit modification (P69-087W1/ER99-03-001) was conditioned to disallow the use of mountain bikes on the trails. Please label pages 2 and 3 of the plot plan notes section accordingly.

   e. The previously approved Major Use Permit modification (P69-087W1/ER99-03-001) was conditioned to restrict the site for use of existing turf and that no additional turf be implemented. Please label pages 2 and 3 of the plot plan notes section accordingly.

   f. The previously approved Major Use Permit modification (P69-087W1/ER99-03-001) was conditioned that horses and hikers be restricted from use of areas outside the use areas and trails. Please label pages 2 and 3 of the plot plan notes section accordingly.

   g. The previously approved Major Use Permit modification (P69-087W1/ER99-03-001) was conditioned to implement a low barrier fence to discourage trespass into the dry montane meadow habitat of Strawberry Flats and the seep adjacent to the trail of Strawberry Flats. Please label and show the location of the fence location on pages 2 and 3 of the plot plan accordingly.

   h. Please show all uses (existing and proposed), including signs, water tanks, etc.

   i. Please include on the plot plan, a table with all structures and the associated square footage.

A replacement plot plan is required to address these comments.

ATTACHMENT B
Memorandums of Understanding

The MOU can be downloaded in word format at
http://www.sdcounty.ca.gov/dplu/docs/MOU.doc

The responsibilities of all parties involved in the preparation of environmental documents for the County (i.e. applicant, individual CEQA consultants/sub-consultants, consulting/sub-consultant firms, and County) are clearly established in the attached MOU for each requested applicable study. The clear identification of roles and responsibilities for all parties is intended to contribute to improved environmental document quality.

Copies must be made and signed by the applicant, consultant and firm (if applicable) for each of the following requested subject area technical studies:

- Groundwater
- Biology

Attachment C
Biological Resources

Based on previous the biological study that was prepared for this site the following biological habitats exist: mixed evergreen forest, black oak woodland, white alder riparian forest, dry montane meadow, montane manzanita chaparral, and developed habitat. The well usage is proposed to increase from 20 acre feet to 70 acre feet per year. Please address impacts of increased groundwater usage on local wetlands within a biological resources report. There is evidence that in the past year the camp has exceeded the allotted ground water usage per the major use permit. Please include analysis of the effects on habitat within the past year and any changes that have occurred due to increased groundwater usage.

The Biological Resource Report must be prepared in accordance with the County's Report Format and Content Requirements Biological Resources, which can be found at http://www.sdcounty.ca.gov/dplu/docs/Biological_Report_Format.pdf

The report will provide a qualitative and quantitative analysis of all on and off-site biological impacts (both direct and indirect) related to all phases of the project.

The report must include a Biological Resources Map showing the location of all vegetation types and sensitive habitats and species of the project site and off-site areas being altered as a result of project implementation. The mapping guidelines are included in the Report Format and Content Guidelines at the link above. In order to evaluate impacts to sensitive resources, the most current project plot plan or preliminary grading plan must be included on the map along with proposed open space and limited building zone easements.

Staff has prepared and attached a comprehensive list of sensitive species that may exist on the project site. Directed and/or protocol surveys are required for species shown in boldface type in the list. The biology report shall address the potential for each sensitive species to occur on the project site (table format). For further guidance please see the Report Format and Content Guidelines.

The report must also propose applicable and feasible mitigation measures. Examples are listed in Appendix A of the Report Format and Content Guidelines.

Comprehensive List of Sensitive Species

Plant	Animal	Scientific Name	Common Name	Directed Survey
X		Calochortus dunnii	Dunn's mariposa lily	X
X		Delphinium hesperium cuyamacae	Cuyamaca larkspur	X
X		Gilia caruifolia	Caraway leaved gilia	
X		Grindelia hirsutula hallii	Hall's gumplant	X
X		Lilium humboldtii ocellatum	Ocellated Humboldt lily	
X		Lilium parryi	Lemon lily	X

X		Limnanthes gracilis parishii	Cuyamaca meadowfoam	X
X		Viola aurea	Golden violet	X
	X	Accipiter cooperi	Cooper's hawk	X
	X	Accipiter striatus	Sharp-shinned hawk	X
	X	Antrozous pallidus	Pallid bat	
	X	Aquila chrysaetos	Golden eagle	X
	X	Ariolimax columbianus stramineas	Banana slug	
	X	Cathartes aura	Turkey vulture	X
	X	Corynorhinus townsendii	Townsend's big-eared bat	
	X	Danaus plexippus	Monarch butterfly	
	X	Diadophis punctatus similis	San Diego ringneck snake	
	X	Eremophila alpestris actis	Horned lark	
	X	*Euderma maculatum*	Spotted bat	
	X	Eumops perotis californicus	Greater western mastiff bat	
	X	Felis concolor	Mountain lion	
	X	Larus californicus	California gull (Non-breeding)	
	X	Lasiurus blossevillii	Western red bat	
	X	Lepus californicus bennettii	*San Diego black-tailed* jackrabbit	
	X	Myotis ciliolabrum	Small-footed myotis	
	X	Myotis evotis	Long eared myotis	
	X	Myotis thysanodes	Fringed myotis	
	X	Myotis volans	Long legged myotis	
	X	Myotis yumanensis	Yuma myotis	
	X	Odocoileus hemionus	Southern mule deer	
	X	Oreortyx pictus eremophila	Mountain quail	
	X	Pyrgus ruralis lagunae	Laguna Mtn. Skipper	X
	X	Taxidea taxus	American badger	

The Memorandum of Understanding must be executed by the applicant and consultant, and subsequently submitted with the first iteration review.

ATTACHMENT D
GROUNDWATER RESOURCES

GROUNDWATER INVESTIGATION

Project Specific Information: Jim Bennett, County Groundwater Geologist, has reviewed the Major Use Permit Modification to increase the previously approved usage of 20 acre feet of groundwater to a maximum of 70 acre feet per year.

General Information: The project is proposing to use groundwater. Based on the potential impacts the project may have on groundwater resources, a groundwater investigation is required to evaluate the significance of potential impacts. The groundwater investigation must be completed using the appropriate sections within the County's approved Guidelines for Determining Significance and Report Format and Content Requirements which can be found on the World Wide Web at http://www.sdcounty.ca.gov/dplu/Resource/docs/3~pdf/GRWTR-Guidelines.pdf (Guidelines)
http://www.sdcounty.ca.gov/dplu/Resource/docs/3~pdf/GRWTR-Report-Format.pdf (Report Formats).

The project is also subject to the Groundwater Ordinance. The investigation must meet the requirements of the SAN DIEGO COUNTY GROUNDWATER ORDINANCE NO. 9826 (NEW SERIES). This document is available at http://www.sdcounty.ca.gov/dplu/Resource/docs/3~pdf/GROUNDWATER-ORD.pdf Since the project is proposing to use greater than 20 acre-feet per year it is considered a water intensive use according to the Groundwater Ordinance. For water intensive projects, a cumulative, or basin-wide, groundwater investigation is required for the proposed project. The proposed project cannot be recommended for approval unless the required findings within Section 67.722 (B) of the County Groundwater Ordinance can be made.

Below is the list of items which must be analyzed in the investigation as described in detail in the Report Format Guidelines and Content Requirements for Groundwater Resources:

50% Reduction of Groundwater in Storage: Groundwater recharge must be evaluated for the basin. The tributary watershed to be included in the analysis shall be provided by DPLU. The computer program RECHARG2 or similar and acceptable methodology must be used to calculate groundwater recharge. Estimates of groundwater storage capacity must be estimated for each hydrogeologic unit at the project site and within the project's watershed. Using groundwater recharge, groundwater demand at the maximum build-out of the basin under the County General Plan, and storage capacity estimated, long-term groundwater availability must be evaluated to indicate whether groundwater in storage will be reduced to a level of 50% or less as a result of potential groundwater extraction at maximum build-out over at least a 30 year period through 2006, including droughts (it should be noted that if storage lowers to more than 50% of

calculated groundwater storage at any time, the project would not be recommended for approval).

Well Testing: Section 67.703.3 of the Groundwater Ordinance identifies the requirement for well tests on nonresidential projects. Well testing will be required to indicate whether the well(s) will be capable of meeting the long-term project demand of 70 acre-feet per year. The analysis must also include evaluation of potential impacts to groundwater dependent vegetation and any other well users in the watershed.

Well Test Plan. Prior to performing any well test, a well test plan must be prepared and submitted to the County Groundwater Geologist for approval. The well test plan must be prepared by an approved County CEQA Consultant for Groundwater Resources. Additionally, all field work associated must be under the direct supervision of the approved County CEQA Consultant. Submittal and approval of this plan will ensure that the well tests are conducted in compliance with the necessary requirements for the project. For items to include in the plan, please refer to Section 1.0, Well Test Plan in Attachment A of the Report Format Guidelines and Content Requirements for Groundwater Resources.

Groundwater Investigation Report: The report shall follow the items outlined in the Report Formats. For Section 2, Existing Conditions, include only a brief description of the existing conditions at and near the project site. Section 3 shall include discussion of the water balance analysis, long-term well yield, potential well interference, and potential impacts to groundwater dependent vegetation.

Section 4 shall provide a summary of project groundwater impacts and mitigation. A Groundwater Mitigation and Monitoring Program (GMMP) will also need to be developed to replace the existing GMMP based on the findings of the groundwater investigation. A threshold for maximum allowable groundwater production for the project must be included in the GMMP. If groundwater dependent vegetation exists near the pumping well(s), thresholds for water level declines in the monitoring well(s) may be required to ensure that significant declines in groundwater levels do not extend to groundwater dependent vegetation. Should the water level thresholds be met, the GMMP must include mitigation measures that include a reduction or cessation in on-site pumping until water levels in the monitoring wells rise above the thresholds. Please work with Jim Bennett, County Groundwater Geologist, on specific language and details to be included in the GMMP.

Please contact Jim Bennett, County Groundwater Geologist, at 858-694-3820 if you have any questions regarding these comments.

The Memorandum of Understanding must be executed by the applicant and consultant and subsequently submitted with the first iteration review.

ATTACHMENT E
DEPARTMENT OF ENVIRONMENTAL HEALTH

DEH has reviewed the above use permit, dated March 14, 2008. This major use permit modification proposes the increase in the pumping of groundwater from the Palomar Mountain Aquifer from 20 acre feet per a year to 70 acre feet per a year. The Department of Environmental Health (DEH) has some concerns regarding the increased pumping of groundwater, and is requesting that the following actions be taken:

1. Provide a narrative that specifies the number of persons living at the property full time, the number of persons working at the property, the highest number of persons visiting for the day, and the highest number of persons that stay overnight. This estimate should include any events such as weddings, or conferences. A licensed engineer is to use these numbers to calculate an estimate of the highest possible 24 hour flow of wastewater that the entire property could generate.

2. DEH does not have a comprehensive site map that shows the locations of all the existing septic systems on the property. Provide a plat that is drawn to a 1" equals 100' scale that shows the property, all the structures and driveways, the water wells, and the locations of each individual septic system on the property. Label each structure as to use.

3. Contact Peter Neubauer, the Small Water System Specialist for DEH in order to update your Small Water System Permit. His phone number is (858) 694-3113. You are currently approved for 350 transient persons maximum. Our records indicate that there may be more persons present on the property during weekends than this permit specifies. Mr. Neubauer will need to know how many persons live at the property, how many persons work at the property, and also the maximum number of transient persons that could be present in 24 hours.

4. The pumping of additional groundwater means that the septic systems receive additional effluent. DEH is concerned that this heavier loading may increase the level of nitrates in groundwater in the Palomar Mountain Aquifer over time. It may be necessary to complete a Nitrate Mass Balance Study to determine the level of nitrate loading. The need to complete this study will be determined after DEH reviews the submitted narrative specifying current flows of wastewater at the site.

5. Please provide a deposit of $1008.00 (Special Project) so that DEH staff can continue the review of this project. At the completion of the project, whatever funds are remaining will be refunded back to the applicant.

RECOMMENDATION

The Department of Environmental Health cannot recommend approval of the increased pumping of groundwater at this time. Please address the concerns outlined above, and submit the requested documents to the attention of Scott Weldon.

If you have any questions regarding the above, please call Scott Weldon at 760-940-2942.

ATTACHMENT F
CULTURAL

PRELIMINARY STAFF CULTURAL RESOURCES REVIEW

Project Specific Information: The project site of the Palomar Christian Conference Center was surveyed in July 1999 by Johanna Buysse and Brian F. Smith with Brian F. Smith and Associates. Two prehistoric milling sites were identified and recorded: CA-SDI-15,380 and 15,381. Because these sites would be directly impacted, a testing and recordation program was conducted at each site in August 1999, which included seven shovel test pits (STP's) and a single test unit excavated to determine the presence and extent of subsurface archaeological deposits. No subsurface deposits were found. The testing resulted in the conclusion that both sites represented localized prehistoric milling stations with no surface or subsurface deposits and were therefore not significant according to CEQA section 15064.5 criteria. No further testing or mitigation was recommended at that time.

The County staff archaeologist will review the proposed project in light of new County Significance Guidelines for Cultural Resources. If no construction had been completed in the area of the two sites (CA-SDI-15,380 and 15,381) and the sites are undisturbed, the County staff archaeologist may visit the project area to review their condition and to determine if the bedrock milling features can be preserved. If the construction of the Conference Center has been completed in the area of the two archaeological sites, and the sites destroyed, the project will be conditioned to have archaeological and Native American monitors on hand for any groundwater drilling that takes place. In addition, if additional grading and construction is planned, grading monitoring will be required.

Sacred Lands Check: County staff will conduct a Sacred Lands Check with the Native American Heritage Commission (NAHC). In addition, staff will communicate with any Native American individual or organization that may possess knowledge about Sacred Sites or be affected by your project. Staff will keep you informed as to future communications with local tribes.

ATTACHMENT G
DEPARTMENT OF PUBLIC WORKS

THE FOLLOWING PRELIMINARY COMMENTS ARE BASED ON AN OFFICE REVIEW BY DPW OF PLOT PLAN RECEIVED March 14, 2008, AND MAY BE REVISED UPON FURTHER REVIEW AND INPUT FROM OTHER AGENCIES.

- Comply with all the requirements as shown on MUP 69-087 W1. All the roads, drainage and street lighting improvements of said MUP 69-087 W1 shall be approved to the satisfaction of the Director of Public Works.
- The proposed project does not increase impervious surface area; therefore, Stormwater Management Plan (SWMP) is not required.

If you have any questions regarding these draft conditions, please contact Susan Hoang at (858) 505-6327.

SUMMARY ENVIRONMENTAL COST ESTIMATE AND DEPOSIT SCHEDULE

Project #: **P69-087W3**
Name: **Baptist Camp MUP Mod**
Date: **April 30, 2008**
Estimator: **Jarrett Ramaiya**

	TASK	Staff Hours	Management Hours	Admin/Student Hours
	AEIS Completeness/Initial Study	8.6	1.2	2.2
2	Extended Initial Studies	18.2	0.7	1.3
	MSCP/BMO or HLP Findings	N/A	N/A	N/A
	Negative Declaration	8.8	1.6	2.7
	Environmental Impact Report	N/A	N/A	N/A
	Addendum/Use of Previous CEQA Document	N/A	N/A	N/A
	Board Policy I-119 Review	N/A	N/A	N/A
	TOTAL LABOR HOURS	35.6	3.5	6.2
	Charge Rates ($/hour)	$ 150.00	$ 183.00	$ 55.00
	Subtotal - County Labor Costs*			$ 6,300
	Fish and Game Fees**			$ 1,927
	TOTAL ESTIMATED COST (Environmental)			**$ 8,227**

DEPOSIT SCHEDULE

Environmental Deposits already paid		$ 1,290
Submit Immediately or Upon Next Submittal, as Appropriate		$ 5,010
Submit Immediately Prior to Public Review		N/A
	*Fish and Game Fees***	$ 1,927
TOTAL DEPOSITS (Environmental)		**$ 8,227**

This is an estimate of County staff time and costs related to Environmental processing only.
Estimates do not include any of the applicant's consultant costs nor County special graphics charges.
* - Labor Cost Subtotal is rounded to the nearest $100.

** Fish and Game fees are collected by the County on behalf of the California Dept. of Fish and Game immediately prior to public review. If the project is the same as a previously approved project for which Fish and Game Fees have already been paid and the project will rely on the previous environmental document in an unmodified form, the receipt showing previous payment of Fish and Game Fees may satisfy this requirement.

GENERAL ASSUMPTIONS:

There will be Extended Initial Studies Required.
The project will be able to be completed using a Negative Declaration.
MSCP/BMO or HLP Findings are not required or HLP Fee has already been paid.

There may be substantial changes in this estimate if any of the following occur:

- The above general assumptions prove incorrect, especially if an EIR is deemed to be required;
- Applicant does not meet turnaround times;
- It takes more or less than three iterations to obtain an adequate EIR or Extended Study (if applicable);
- Previously unknown public controversy occurs;
- Recirculation of the ND or EIR for public review is required;
- Your project is appealed to a hearing body for any reason.

XIS Factor: 2
MSCP/BMO/HLP Factor: N/A
Project Factor: 2

ESTIMATED PROCESSING SCHEDULE

Project Name: **Baptist Camp Major Use Permit Modification**
Project Number: **P69-087W3**
Staff Completing Schedule: Jarrett Ramaiya
Decision-Making Body: Planning Commission
Date Schedule Produced/Revised: 5/15/2008

TASK/ACTIVITY	Estimated Duration	Estimated Completion Date	Actual Completion Date
APPLICATION SUBMITTAL			**3/14/2008**
DPLU reviews for application "completeness", determines project issues, costs and schedule	30	4/14/2008	5/15/2008
Applicant Submits 1st Draft Extended Initial Studies	**120**	**9/12/2008**	
DPLU Reviews 1st Draft Extended Initial Studies	30	10/13/2008	
Applicant Submits 2nd Draft Extended Initial Studies*	**45**	**11/27/2008**	
DPLU Reviews 2nd Draft Extended Initial Studies	21	12/18/2008	
DPLU finalizes Environmental Initial Study and Prepares Application Amendment Form	21	1/8/2009	
Applicant submits Application Amendment form, F&G fees, copies of Extended Initial Studies	***14***	***1/22/2009***	
DPLU completes, advertises and distributes draft Negative Declaration	21	2/12/2009	
Public review of draft Negative Declaration	30	3/16/2009	
DPLU develops draft condition language and mitigation monitoring program	*30*	*4/15/2009*	
DPLU reviews public review comments per "Fair Argument Standard", finalizes documentation	10	4/27/2009	
DPLU makes final staff recommendation on the project	*10*	*5/7/2009*	
DPLU completes final documents, dockets project and initial **PROJECT HEARING/DECISION**	30	6/11/2009	

Total Estimated Duration 65 weeks
15.0 months

Bolded tasks are under the control of applicant/consultant.
Italicized tasks are completed concurrently with other tasks.
* - Task can be eliminated if earlier draft documents are adequate.

Assumptions:

Project will be completed using a Negative Declaration and extended Initial Studies will be required.
Public Comments and Hearing comments will not meet the "Fair Argument" standard requiring an Environmental Impact Report.
Applicant/consultant will provide adequate Extended Initial Studies in two iterations.
Applicant/Consultant will submit all required information in accordance with the estimated schedule.
The project will not be continued by the decision-making body nor appealed.
Any Department of Public Works or Department of Environmental Health issues will be resolved concurrently with the environmental process.

The Hearing/Decision date is subject to Decision-Making Body availability and schedule.
Dates which fall upon a holiday will have an actual completion date the first business day after such holiday.

ATTACHMENT D
GROUNDWATER COMMENTS

Jim Bennett, County Groundwater Geologist, has reviewed the Groundwater Investigation Report prepared by Environmental Navigation Services, Inc. and submitted to the County on March 27, 2009.

Please revise the Report to address the following comments:

1. Page 6, Section 2.2 Rainfall: Average annual precipitation is between 33 and 35 inches, not 36 inches as stated. Please revise throughout the document. Also, if precipitation used from Palomar Mountain precipitation station were adjusted, please revise using 33 to 35 inches as the adjustment. This will result in slightly less precipitation.

2. Page 6 Section 2.2. Rainfall: Please include the imbedded graph that is missing from Figure 4. Also, please include as a table the 34 year historical precipitation data set that was utilized for use with recharge calculations.

3. Page 5, Land Use and Offsite Water Demands: Please include a discussion of the General Plan designation which for the entire watershed is National Forest and State Parks (23). All the private parcels are located within the Cleveland National Forest and thus have a minimum residential parcel size of 40 acres (as opposed to the assumption made in the report of 10 acres). As such, only 26 homes could be developed at maximum buildout of the General Plan.

4. The water demand needs to be broken down into 3 scenarios (include each scenario in Table 2) which are required to be analyzed in the water balance for this project:

    a. Existing Conditions (45.3 afy total demand): 9 single-family residences with a consumptive use of 4.5 afy, the current PCCC demand of 33 afy (based on 2007 demand), and the Palomar State Park/School demand of 5.8 afy.

    b. Existing Conditions Plus the Project (80.3 afy total demand): existing conditions offsite demand of 10.3 afy plus 70 afy demand at project site.

    c. Current General Plan Buildout (103 afy total demand): 26 single-family residences with a consumptive use of 13 afy, PCCC demand of 70 afy, and Palomar State Park/School demand of 20 afy.

5. Page 11, Section 2.6., Hydrogeologic Units: At the bottom of the page, drillers observations of DG should be moved out of the Granitic Bedrock discussion and into the discussion on DG above. An additional 5 drillers well logs were reviewed by DPLU from other wells drilled within the project watershed. The reports will

be forwarded for use in this report. Please report the DG from each log within the DG discussion.

6. Page 14, Off-Site Hydrologic Inventory: Please include an expanded discussion with details from the 5 drillers well logs DPLU has found offsite within the project watershed. Include a new table in the same format as Table 4 to summarize the pertinent data from each well log.

7. Page 19, Table 6. Please include Table 6 in report, it is missing. Please be sure that Table 6 includes the Hydrologic Group and the runoff character of each soil type.

8. Page 22, Section 3.1.2.5 Assessment of Overall Water Balance. Please include a summary table of water balance results for existing conditions, existing conditions plus the project, and the General Plan buildout. A sample table will be e-mailed to the groundwater consultant. Additionally, include a realistic buildout scenario showing impacts under the General Plan buildout with septic return flows for the PCCC included.

9. Page 27 and 28, Significance of Impacts Prior to Mitigation: Please include Well 5 in the impact analysis to streamflow. Well 5 is located adjacent to a tributary drainage of the Pauma Creek.

10. Page 28, Well Interference: The nearest offsite well is located is located on a residential parcel approximately one mile from the site (APN 112-160-08-00). Please use this location as the closest well location. Also, please update Figure 3 with additional well locations as identified by DPLU from well log records found. Please include discussion of well interference methodology used. Include a table with well interference calculations shown.

Minor Edits

11. Page 3, Introduction, first paragraph: Please change the last paragraph to read "The County approved a Major Use Permit modification to expand and improve facilities under DPLU permit P69-087W1.

12. Section 1.3. Please strike all text in this section and revise to read as follows: The project is subject to the San Diego County Groundwater Ordinance (N.S. #9826). Since the project is proposing greater than 20 acre-feet of groundwater per year, it is considered a "water intensive use" by definition within the Ordinance. As such, Section 67.722.B. requires a groundwater investigation be conducted and that the following finding be made for the project: *"for a water intensive use, that groundwater resources are adequate to meet the groundwater demands of the project and the groundwater basin if it were developed to the maximum density and intensity permitted by the General Plan."* Section 67.703 further requires for non-residential projects that well testing be

conducted per procedures approved by the Director which are generally more extensive than those applicable for a residential well test.

The project is also subject to the County Guidelines for Determining Significance Groundwater Resources. The following thresholds for determining significance are applicable to this project:

Water Balance Analysis: For proposed projects in fractured rock basins, a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50% or less as a result of groundwater extraction.

Well Interference (Fractured Rock Basins): As an initial screening tool, offsite well interference will be considered a significant impact if after a five year projection of drawdown, the results indicate a decrease in water level of 20 feet or more in the offsite wells. If site-specific data indicates water bearing fractures exist which substantiate an interval of more than 400 feet between the static water levels in each offsite well and the deepest major water bearing fracture in the well(s), a decrease in saturated thickness of 5% or more in the offsite wells would be considered a significant impact.

13. Page 14, Water Quality. For discussion on manganese, please specify that manganese is a "secondary" MCL, which is not an enforceable potability standard.

Please provide all changes in strikeout-underline format and submit electronically as a Microsoft Word document.

Please contact Jim Bennett, County Groundwater Geologist, at 858-694-3820 if you have any questions regarding these comments.

ATTACHMENT D
GROUND WATER PRELIMINARY APPROVAL

Jim Bennett, County Groundwater Geologist, has reviewed the Water Supply Report: Palomar Christian Conference Center by Environmental Navigation Services dated June 22, 2009. Appendix F of the report has been re-written by DPLU as follows and it is requested that the language be inserted into the report. In addition, there was a minor typographical error found in Table 8 which was e-mailed to the consultant for revision. With these two minor revisions incorporated, the report is accepted and a final copy will be required at the Application Amendment Form (AAF) stage. No further groundwater information is necessary at this time. A final QA/QC of the report will be conducted of the document upon submission.

Appendix F
Groundwater Monitoring and Mitigation Plan

The Palomar Christian Conference Center is solely reliant on groundwater for domestic water requirements in an area with limited groundwater resources. Such use is contingent on the on-going implementation of a Groundwater Monitoring and Mitigation Plan (GMMP) that consists of the following requirements:

Groundwater Production and Water Level Monitoring

- Instantaneous flow meters shall be installed to monitor cumulative groundwater usage on all current wells (production wells 3 and 5) and future production wells.
- Groundwater production from the flow meters shall be monitored and recorded monthly in all production wells.
- Groundwater levels shall be measured monthly at wells 3, 4, and 5 for the first two years of groundwater production of site operations after build out is completed. At that time, pending an evaluation of the water level and pumping data base, water level measurement frequency may be reduced to every three months upon DPLU approval.

Whenever possible, groundwater production wells shall be de-activated for at least eight hours before measuring groundwater levels. Additionally, a repeat water level measurement shall be taken at a production well no sooner than five minutes after the initial measurement to assess how dynamic the water level is in the pumping well.

The facility shall track groundwater production over time and assess the rate of production compared to the annual production limit of 70 acre-feet per year to better assure deviations from anticipated water use are identified early and excess water demands reduced. The tracking shall be conducted bearing in mind that groundwater demand is expected to be highest during the summer months.

Groundwater Mitigation Criteria

The criteria for groundwater production monitoring shall be the annual groundwater production, from January 1 through December 31, shall not exceed a total production of 70 acre-feet per year. This limit does not include water used for fire protection during an emergency situation. No carry over of water not used from other years shall be permitted to occur.

If total groundwater production exceeds **59.5 acre-feet** by November 1st, the following steps will be taken:

- Within seven days notify the Director of DPLU (the Director) via phone call and e-mail
- Rigorous conservation measures will be implemented including reduction of landscape irrigation
- Water production data will be collected twice a week
- A monthly report will be filed with the Director by the 5th of the following month to ensure compliance with these requirements

If total groundwater production exceeds **64.4 acre-feet** by December 1st, the following steps will be taken:

- Within seven days notify the Director via phone call and e-mail
- Rigorous conservation measures will be implemented including elimination of landscape irrigation
- Water production data shall be collected twice a week
- Arrangements shall be prepared to provide domestic water to the facility via tanker truck on a temporary basis if groundwater production exceeds 67.2 acre-feet. The source of potable water shall either be from an imported water source or from a DPLU approved groundwater source. If implemented, this mitigation would not be expected to be either a long-term or an annual solution to a water budget deficit.
- A monthly report will be filed with the Director by the 5th of the following month to ensure compliance with these requirements.

If total groundwater production reaches 70 acre-feet prior to the end of the calendar year, the following steps will be taken:

- Terminate groundwater production at all wells
- Provide domestic water to the facility via tanker truck on a temporary basis until the beginning of the calendar year
- Evaluate cause of excess water demand and develop plan to reduce water demand. Submit plan to the Director by January 21st of the new calendar year.

Reporting

Data from groundwater production and water level monitoring shall be submitted to DPLU annually. The monitoring report shall cover the period of January 1st to December 31st, and shall be due on January 21st. The report shall include a chart of groundwater production over time and water level hydrographs.

Future Production Wells

Any future water supply well locations shall be placed in locations that consider the potential for wastewater impacts as were historically noted to occur in existing well 1. Oversight shall be provided by the County of San Diego Department of Environmental Health (DEH). All future water supply wells installed are subject to well testing per DPLU guidelines and State Waterworks standards to assess whether adequate production exists to meet demand requirements of the facility. Additionally, groundwater production and water levels shall be recorded from any future production well.

It should be noted that this plan is separate and independent of any water quality reporting requirements required for the facility's DEH regulated water system.

APPENDIX B.
PCCC Water Use

Appendix B
PCCC Current and Future Water Demand Estimate

A record of daily water use, staff population, and guest census was kept by the Palomar Christian Conference Center (PCCC) for the period of July to December 2007. The data were used to estimate potential water demands and wastewater return flows. The PCCC has a range of guest accommodations and typically provides a bed and 3 meals for their guest (a 'camper day' as described in the industry). There are four categories of accommodations relative to the estimated water demand for staff and guests shown in Table B-1 as single family residences, "motel", small dormitory, and dormitory:

Table B-1
Estimated Water Demand, July to December 2007

Use	Accommodations	Maximum Number (2007)	Maximum Number (Future)	Daily Water Demand, gpd/person
PCCC Staff (and families)	Single Family Residences	45	69	100
RV Sites (Staff)	10 sites (2 occupants/site)	20	20	80
Guest	"Motel", with private baths	127	211	80
Guest	Small Dormitory	69	101	60
Guest	Dormitory	163	163	40
Future Guest	Assumes "Motel"		10	80
	Total guests:	359	485*	

* It is understood that the Major Use Permit Modification allows for 485 guests.

The estimated water demand was calculated by combining census and water use records over approximately one week intervals. A baseline irrigation and outside water use rate of 30,000 gallons per day was estimated for July, and the census numbers and daily demand estimates (per accommodation) used to calculate a total water use over the approximately one week periods. The accommodations typically fill up as a matter of preference in the order shown in **Table B-1**, so the calculations were set up accordingly since water demand varies by type of accommodation. Since there are a number of storage tanks in use, the weekly averages help to minimize the effect of system storage in the estimates. The calculations are shown in **Table B-2**.

Since the irrigation demand varies over the year as a function of evapotranspiration rates, the baseline irrigation rate was reduced proportionally to the monthly irrigation demand provided by the California Irrigation Management Information System (CIMIS: www.cimis.water.ca.gov). CIMIS is a program in the Office of Water Use Efficiency

(OWUE), California Department of Water Resources (DWR) that manages a network of over 120 automated weather stations in the state of California. CIMIS was developed in 1982 by the California Department of Water Resource and the University of California at Davis to assist California's irrigators to manage their water resources efficiently. The ET data published by CIMIS for Zone 9 were used for this report. The irrigation factors used in this estimate are shown in **Table B-3**. These are used to estimate the monthly irrigation demand based on an assumed peak rate for July water use (currently 33,000 gpd). It is estimated that current annual irrigation rates are approximately 18 Acft/yr, applied over a 9 month period (as shown in **Table B-4**). The annual demand over the 9 month period is 48 inches/yr, or 4 ft/acre. Thus the irrigation demand corresponds to the irrigation of approximately 5 acres of turf. Future demand is assumed to increase by 50%, allowing for approximately 7 acres of irrigated turf.

A comparison of the known and estimated water demand is shown in **Figure B.1**. It is recognized that these demand estimates are non-unique and that other combinations of the demand estimates may provide similar results. The overall estimate exceed the actual use by 7%, thought there is some variability in the weekly estimates.

Review of the data shows that irrigation demands comprise approximately 60% of the total water demand over the 6-month period. **Figure B.2** shows the cumulative water demand for the July to December monitoring period. Irrigation was shut down after November 15, and while the PCCC was evacuated in October 2007 for the Poomacha wildfire. Total fire fighting water demands were also measured by the cumulative flowmeters installed on the production wells. No daily measurements were obtained and the irrigation systems were shut down while the PCCC was evacuated. Review of the overall cumulative demand indicates that the water demand during the firefighting period was very similar to the operational demand of the PCCC.

Current and future annual groundwater use rates are estimated in **Table B-4**. These are conservative estimates. A septic return flow rate of 80% is assumed for indoor water uses and no recharge is assumed for irrigation. The current projected future groundwater demand is 36 Acft/yr, an increase of 14 Acft/yr from current estimates. Future groundwater demands are estimated based on the maximum projected number of staff and guests following the permitted expansion of the PCCC. The projected water demand is shown in **Table B-4** and conservatively assumes 100% occupancy at the maximum number of permitted guests (485) with projected staffing accommodations.

Also included in this Appendix is **Table B-5** that calculates the estimated groundwater demand for Palomar Mountain State Park. There are two wells. A large portion of the water demand is used to support the Polomar Outdoor School.

Figure B.1
Reported versus Estimated Water Demand
July to December 2007

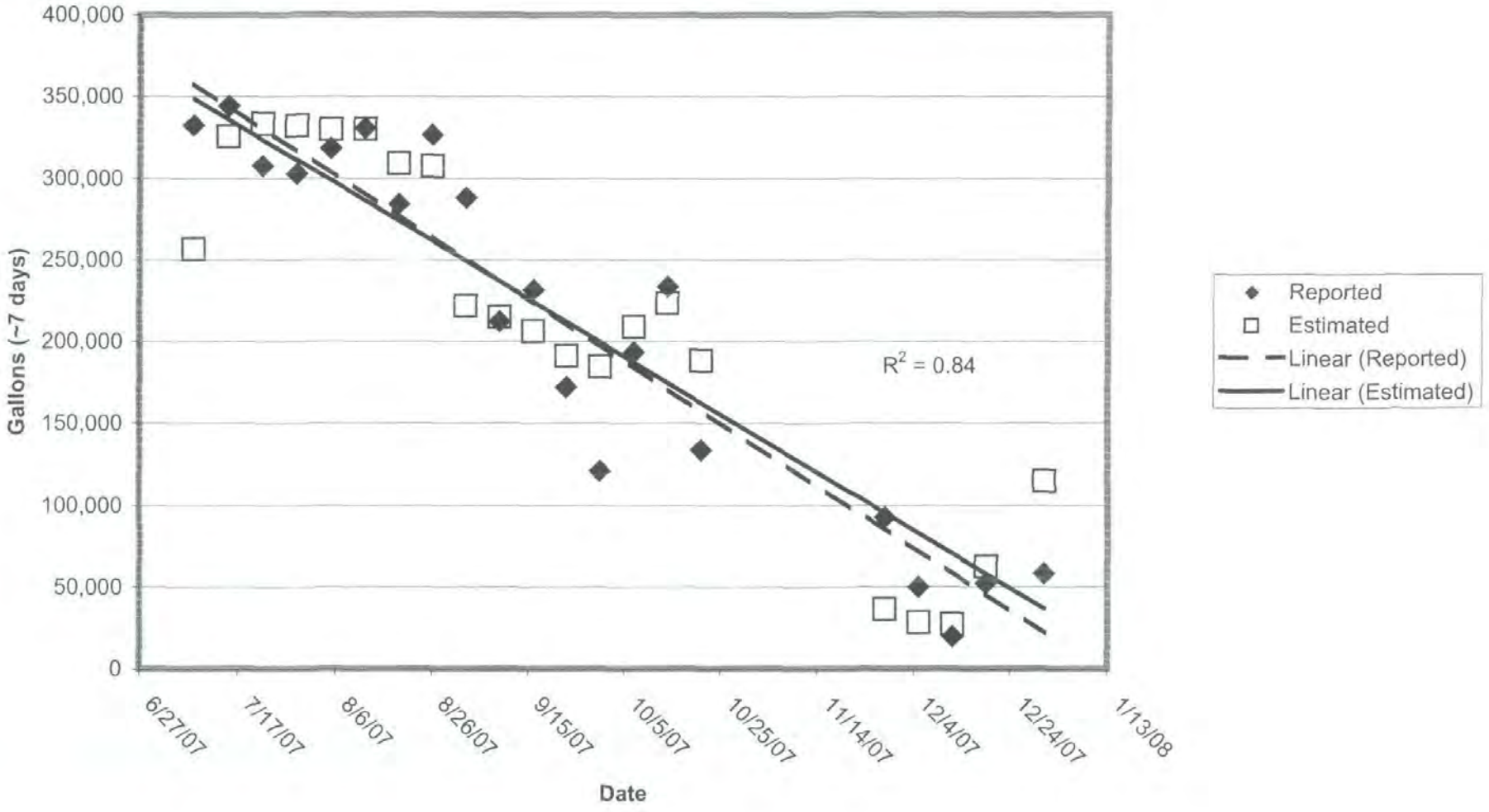


Figure B.2
PCCC Cumulative Water Use,
July to Dec 2007

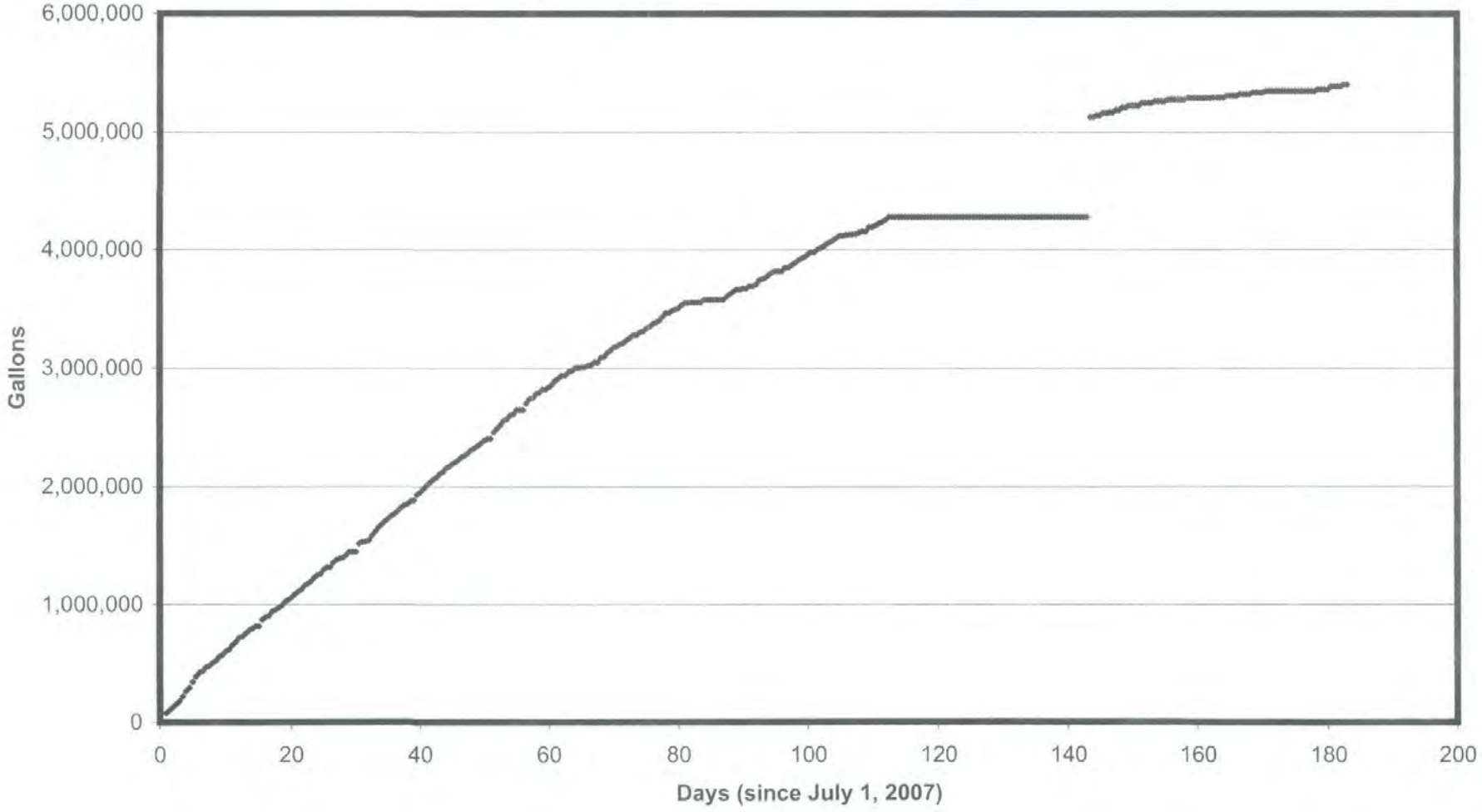


Table B-2. Estimated Water Demand

WATER USE, gpd

(max rate: 30,000 | irrig: 80 | motel: 40 | dorm: 100 | staff: 60 | dorm_plus:

Days avg'd	Reported	Estimated	Est. Irrig.	Difference	
	4,404,230	4,430,970	2,650,230	-26,740	sum
	(Est > Reported)		60%	106.9%	pct

	Date	Reported	Estimated	Est. Irrig.	
6	7/8/07	332499	256580	180000	75919
7	7/15/07	344207	325440	205800	18767
7	7/22/07	307753	333320	201600	-25567
7	7/29/07	302900	332140	201600	-29240
7	8/5/07	318343	329620	197400	-11277

Water Use

	Irrigation Factor	staff 45 max	motel 127 max 172 total	dorm+ 69 max 241 total	dorm 163 max
totals:		6793	10974	3458	2470
avg/156 days		43.8	70.8	22.3	15.9
		% occ:	67%	37%	10%

day of week	Date	# per.						Time		Cumulative gallons	Interval gallons
								7/1/07 8:50	days	5400109	
										16.6	(acft/6 mo)
m	7/2/07	172	1.000	45	127	0	0	7/2/07 8:00			
								7/2/07 20:00	1.0	77554	77554
t	7/3/07	172	1.000	45	127	0	0	7/3/07 7:40	1.5	101665	24111
								1/0/00 17:40	2.0	126653	24988
w	7/4/07	172	1.000	45	127	0	0	7/4/07 7:45	2.5	151478	24825
								1/0/00 16:35	3.0	177015	25537
r	7/5/07	212	1.000	45	127	40	0	7/5/07 8:15	3.5	219289	42274
								1/0/00 21:15	4.0	263794	44505
f	7/6/07	220	1.000	45	127	48	0	7/6/07 6:25	4.5	290778	26984
								1/0/00 15:55	5.0	341367	50589
sa	7/7/07	92	1.000	45	47	0	0	7/7/07 8:10	5.5	389059	47692
								1/0/00 21:12	6.0	420172	31113
su	7/8/07	44	1.000	44	0	0	0	7/8/07 8:10	6.5	434164	13992
								1/0/00 22:15	7.0	462584	28420
m	7/9/07	40	1.000	40	0	0	0	7/9/07 8:25	7.5	477434	14850
								1/0/00 20:10	8.0	499804	22370
t	7/10/07	375	1.000	45	127	69	134	7/10/07 8:25	8.5	520689	20885
								1/0/00 17:45	9.0	550808	30119
w	7/11/07	375	1.000	45	127	69	134	7/11/07 8:25	9.5	568064	17256
								1/0/00 20:00	10.0	595104	27040
r	7/12/07	375	1.000	45	127	69	134	7/12/07 8:35	10.5	616064	20960
								1/0/00 19:45	11.0	651696	35632
f	7/13/07	137	1.000	45	92	0	0	7/13/07 6:57	11.5	677394	25698
								1/0/00 19:27	12.0	717216	39822
sa	7/14/07	111	1.000	45	66	0	0	7/14/07 7:25	12.5	728579	11363
								1/0/00 20:10	13.0	758137	29558
su	7/15/07	309	0.980	45	127	69	68	7/15/07 8:20	13.5	778371	20234
								1/0/00 19:35	14.0	795597	17226
m	7/16/07	309	0.980	45	127	69	68	7/16/07 8:55	14.5	814024	18427
								1/0/00 0:00	15.0	814024	0
t	7/17/07	309	0.980	45	127	69	68	7/17/07 9:20	15.5	872139	58115
								1/0/00 18:40	16.0	892524	20385
w	7/18/07	309	0.980	45	127	69	68	7/18/07 9:00	16.5	899824	7300
								1/0/00 19:10	17.0	937224	37400
r	7/19/07	309	0.980	45	127	69	68	7/19/07 9:00	17.5	950124	12900
								1/0/00 20:49	18.0	968697	18573
f	7/20/07	309	0.980	45	127	69	68	7/20/07 8:45	18.5	990424	21727
								1/0/00 20:20	19.0	1019424	29000
sa	7/21/07	104	0.980	45	59	0	0	7/21/07 8:30	19.5	1036622	17198
								1/0/00 20:02	20.0	1057824	21202
su	7/22/07	176	0.960	45	127	4	0	7/22/07 8:00	20.5	1086124	28300
								1/0/00 19:30	21.0	1108407	22283
m	7/23/07	277	0.960	45	127	69	36	7/23/07 8:49	21.5	1124659	16252
								1/0/00 19:30	22.0	1155165	30506
t	7/24/07	277	0.960	45	127	69	36	7/24/07 9:20	22.5	1173644	18479
								1/0/00 19:00	23.0	1195824	22180
w	7/25/07	283	0.960	45	127	69	42	7/25/07 9:30	23.5	1223302	27478
								1/0/00 18:55	24.0	1246288	22986
r	7/26/07	283	0.960	45	127	69	42	7/26/07 7:25	24.5	1256963	10675
								1/0/00 19:00	25.0	1292124	35161
f	7/27/07	288	0.960	45	127	69	47	7/27/07 8:30	25.5	1317824	25700
								1/0/00 0:00	26.0	1317824	0
sa	7/28/07	118	0.960	45	73	0	0	7/28/07 8:35	26.5	1356593	38769
								1/0/00 20:15	27.0	1380552	23959
su	7/29/07	229	0.960	45	127	57	0	7/29/07 8:00	27.5	1389024	8472
								1/0/00 18:15	28.0	1398890	9866
m	7/30/07	315	0.960	45	127	69	74	7/30/07 9:05	28.5	1421252	22362
								1/0/00 19:00	29.0	1447727	26475
t	7/31/07	315	0.960	45	127	69	74	7/31/07 0:00	29.5	1447727	0
								1/0/00 0:00	30.0	1447727	0
w	8/1/07	315	0.940	45	127	69	74	8/1/07 8:50	30.5	1517781	70054
								1/0/00 20:10	31.0	1529424	11643
r	8/2/07	315	0.940	45	127	69	74	8/2/07 8:35	31.5	1534255	4831
								1/0/00 18:55	32.0	1545766	11511
f	8/3/07	271	0.940	45	127	69	30	8/3/07 9:00	32.5	1583924	38158
								1/0/00 19:00	33.0	1615724	31800
sa	8/4/07	252	0.940	45	127	69	11	8/4/07 8:14	33.5	1654377	38653
								1/0/00 19:33	34.0	1680854	26477
su	8/5/07	63	0.940	45	18	0	0	8/5/07 8:35	34.5	1707367	26513
								1/0/00 19:04	35.0	1731291	23924
m	8/6/07	157	0.940	45	112	0	0	8/6/07 9:00	35.5	1753261	21970
								1/0/00 20:35	36.0	1774123	20862
t	8/7/07	253	0.940	45	127	69	12	8/7/07 8:30	36.5	1794904	20781
								1/0/00 20:15	37.0	1821570	26666
w	8/8/07	253	0.920	45	127	69	12	8/8/07 9:36	37.5	1840657	19087
								1/0/00 19:50	38.0	1853242	12585
r	8/9/07	251	0.920	45	127	69	10	8/9/07 9:13	38.5	1878710	25468
								1/0/00 19:00	39.0	1886432	7722
f	8/10/07	312	0.920	45	127	69	71	8/10/07 11:00	39.5	1930099	43667
								1/0/00 19:00	40.0	1955524	25425
sa	8/11/07	293	0.920	45	127	69	52	8/11/07 8:30	40.5	1981533	26009

7	8/12/07	330691	330180	193200	511	su	8/12/07	352	0.920	45	127	69	111	1/0/00 19:30	41.0	2014641	33108
														8/12/07 7:48	41.5	2038058	23417
														1/0/00 20:10	42.0	2059644	21586
						m	8/13/07	352	0.920	45	127	69	111	8/13/07 8:27	42.5	2075696	16052
														1/0/00 19:00	43.0	2104404	28708
						t	8/14/07	352	0.920	45	127	69	111	8/14/07 9:00	43.5	2122278	17874
														1/0/00 19:45	44.0	2155424	33146
						w	8/15/07	352	0.870	45	127	69	111	8/15/07 8:45	44.5	2166967	11543
														1/0/00 20:17	45.0	2192266	25299
						r	8/16/07	137	0.870	45	92	0	0	8/16/07 8:35	45.5	2206799	14533
														1/0/00 20:33	46.0	2228438	21639
						f	8/17/07	237	0.870	45	127	65	0	8/17/07 10:45	46.5	2248647	20209
														1/0/00 19:50	47.0	2266115	17468
						sa	8/18/07	154	0.870	45	109	0	0	8/18/07 8:25	47.5	2283837	17722
														1/0/00 19:10	48.0	2308804	24967
7	8/19/07	283990	308960	182700	-24970	su	8/19/07	150	0.870	45	105	0	0	8/19/07 7:40	48.5	2322048	13244
														1/0/00 20:15	49.0	2343522	21474
						m	8/20/07	308	0.870	45	127	69	67	8/20/07 9:05	49.5	2363833	20311
														1/0/00 20:07	50.0	2387151	23318
						t	8/21/07	308	0.870	45	127	69	67	8/21/07 9:21	50.5	2403246	16095
														1/0/00 0:00	51.0	2403246	0
						w	8/22/07	308	0.845	45	127	69	67	8/22/07 8:43	51.5	2459600	56354
														1/0/00 18:30	52.0	2491668	32068
						r	8/23/07	212	0.845	45	127	40	0	8/23/07 8:30	52.5	2518714	27046
														1/0/00 21:40	53.0	2554052	35338
						f	8/24/07	232	0.845	45	127	60	0	8/24/07 9:00	53.5	2567307	13255
														1/0/00 19:00	54.0	2599677	32370
						sa	8/25/07	232	0.845	45	127	60	0	8/25/07 8:00	54.5	2611420	11743
														1/0/00 19:00	55.0	2648420	37000
7	8/26/07	326372	307330	177450	19042	su	8/26/07	137	0.845	45	92	0	0	8/26/07 0:00	55.5	2648420	0
														1/0/00 0:00	56.0	2648420	0
						m	8/27/07	93	0.845	45	48	0	0	8/27/07 8:10	56.5	2703257	54837
														1/0/00 19:20	57.0	2739265	36028
						t	8/28/07	93	0.845	45	48	0	0	8/28/07 8:00	57.5	2746423	7158
														1/0/00 20:25	58.0	2780241	33818
						w	8/29/07	93	0.845	45	48	0	0	8/29/07 8:15	58.5	2793550	13309
														1/0/00 18:00	59.0	2819867	26317
						r	8/30/07	93	0.845	45	48	0	0	8/30/07 8:20	59.5	2819867	0
														1/0/00 20:20	60.0	2838155	18288
						f	8/31/07	25	0.845	25	0	0	0	12/8/09 0:00	60.5	2862412	24257
														1/0/00 18:36	61.0	2893630	31218
						sa	9/1/07	89	0.808	45	44	0	0	9/1/07 8:30	61.5	2909661	16031
														1/0/00 18:36	62.0	2934082	24421
7	9/2/07	288018	221580	169680	66438	su	9/2/07	89	0.808	45	44	0	0	9/2/07 9:35	62.5	2936438	2356
														1/0/00 16:44	63.0	2964729	28291
						m	9/3/07	89	0.808	45	44	0	0	9/3/07 7:37	63.5	2976808	12079
														1/0/00 16:50	64.0	3003165	26357
						t	9/4/07	30	0.808	30	0	0	0	9/4/07 7:30	64.5	3003165	0
														1/0/00 19:04	65.0	3007511	4346
						w	9/5/07	30	0.808	30	0	0	0	9/5/07 8:00	65.5	3007511	0
														1/0/00 17:16	66.0	3019458	11947
						r	9/6/07	30	0.808	30	0	0	0	9/6/07 8:00	66.5	3025935	6477
														1/0/00 19:00	67.0	3046936	21001
						f	9/7/07	203	0.808	45	127	31	0	9/7/07 8:00	67.5	3047010	74
														1/0/00 19:00	68.0	3088705	41695
						sa	9/8/07	203	0.770	45	127	31	0	9/8/07 8:09	68.5	3099995	11290
														1/0/00 19:04	69.0	3129385	29390
7	9/9/07	212035	214660	161700	-2625	su	9/9/07	29	0.770	29	0	0	0	9/9/07 8:40	69.5	3148473	19088
														1/0/00 16:56	70.0	3173537	25064
						m	9/10/07	29	0.770	29	0	0	0	9/10/07 8:20	70.5	3182447	8910
														1/0/00 19:14	71.0	3204659	22212
						t	9/11/07	29	0.770	29	0	0	0	9/11/07 7:54	71.5	3213032	8373
														1/0/00 18:56	72.0	3236630	23598
						w	9/12/07	29	0.770	29	0	0	0	9/12/07 8:33	72.5	3254356	17726
														1/0/00 19:00	73.0	3277001	22645
						r	9/13/07	135	0.770	45	90	0	0	9/13/07 10:10	73.5	3277705	704
														1/0/00 18:34	74.0	3298855	21150
						f	9/14/07	191	0.770	45	127	19	0	9/14/07 9:00	74.5	3309615	10760
														1/0/00 0:00	75.0	3331369	21754
						sa	9/15/07	191	0.720	45	127	19	0	9/15/07 8:18	75.5	3341826	10457
														1/0/00 18:59	76.0	3370934	29108
7	9/16/07	231537	206100	151200	25437	su	9/16/07	29	0.720	29	0	0	0	9/16/07 7:25	76.5	3380010	9076
														1/0/00 18:10	77.0	3400062	20052
						m	9/17/07	29	0.720	29	0	0	0	9/17/07 8:34	77.5	3428629	28567
														1/0/00 0:00	78.0	3464014	35385
						t	9/18/07	29	0.720	29	0	0	0	9/18/07 10:28	78.5	3464014	0
														1/0/00 18:33	79.0	3480537	16523
						w	9/19/07	29	0.720	29	0	0	0	9/19/07 8:06	79.5	3495682	15145
														1/0/00 17:00	80.0	3502251	6569
						r	9/20/07	29	0.720	29	0	0	0	9/20/07 9:26	80.5	3531255	29004
														1/0/00 16:55	81.0	3549197	17942
						f	9/21/07	226	0.720	45	127	54	0	9/21/07 9:20	81.5	3549197	0
														1/0/00 19:00	82.0	3551958	2761
						sa	9/22/07	226	0.670	45	127	54	0	9/22/07 8:10	82.5	3551958	0
														1/0/00 18:00	83.0	3551958	0
7	9/23/07	171948	191000	140700	-19052	su	9/23/07	29	0.670	29	0	0	0	9/23/07 8:10	83.5	3551958	0
														1/0/00 19:30	84.0	3577541	25583
						m	9/24/07	29	0.670	29	0	0	0	9/24/07 7:56	84.5	3577541	0
														1/0/00 0:00	85.0	3577541	0
						t	9/25/07	1	0.670	1	0	0	0	9/25/07 0:00	85.5	3577541	0
														1/0/00 0:00	86.0	3577541	0
						w	9/26/07	29	0.670	29	0	0	0	9/26/07 0:00	86.5	3577541	0
														1/0/00 0:00	87.0	3577541	0
						f	9/27/07	29	0.670	29	0	0	0	9/27/07 7:58	87.5	3604915	27374
														1/0/00 18:58	88.0	3628595	23680

						f	9/28/07	195	0.670	45	127	23	0	9/28/07 9:00	88.5	3644035	15440
														1/0/00 18:25	89.0	3660817	16782
						sa	9/29/07	195	0.670	45	127	23	0	9/29/07 8:45	89.5	3660817	0
														1/0/00 16:16	90.0	3672787	11970
7	9/30/07	120829	184480	140700	-63651	su	9/30/07	29	0.670	29	0	0	0	9/30/07 8:00	90.5	3672787	0
														1/0/00 16:50	91.0	3689278	16491
						m	10/1/07	175	0.610	45	127	3	0	10/1/07 8:20	91.5	3689278	0
														1/0/00 19:00	92.0	3703107	13829
						t	10/2/07	175	0.610	45	127	3	0	10/2/07 11:17	92.5	3740009	36902
														1/0/00 19:00	93.0	3747935	7926
						w	10/3/07	175	0.610	45	127	3	0	10/3/07 9:00	93.5	3764309	16374
														1/0/00 18:31	94.0	3785529	21220
						r	10/4/07	30	0.610	30	0	0	0	10/4/07 8:00	94.5	3806860	21331
														1/0/00 19:00	95.0	3818525	11665
						f	10/5/07	179	0.610	45	127	7	0	10/5/07 9:00	95.5	3819003	478
														1/0/00 19:00	96.0	3819003	0
						sa	10/6/07	179	0.610	45	127	7	0	10/6/07 9:44	96.5	3847677	28674
														1/0/00 19:00	97.0	3849682	2005
7	10/7/07	193283	208780	128100	-15497	su	10/7/07	30	0.610	30	0	0	0	10/7/07 7:40	97.5	3866070	16388
														1/0/00 18:55	98.0	3884935	18865
						m	10/8/07	279	0.540	45	127	69	38	10/8/07 9:21	98.5	3909426	24491
														1/0/00 19:00	99.0	3924115	14689
						t	10/9/07	279	0.540	45	127	69	38	10/9/07 9:00	99.5	3938335	14220
														1/0/00 19:00	100.0	3958270	19935
						w	10/10/07	159	0.540	45	114	0	0	10/10/07 9:00	100.5	3977773	19503
														1/0/00 0:00	101.0	3977773	0
						r	10/11/07	159	0.540	45	114	0	0	10/11/07 9:00	101.5	4001013	23240
														1/0/00 19:00	102.0	4015527	14514
						f	10/12/07	259	0.540	45	127	69	18	10/12/07 9:00	102.5	4028750	13223
														1/0/00 19:00	103.0	4050536	21786
						sa	10/13/07	259	0.540	45	127	69	18	10/13/07 9:15	103.5	4063496	12960
														1/0/00 17:30	104.0	4082635	19139
7	10/14/07	233541	223320	113400	10221	su	10/14/07	30	0.540	30	0	0	0	10/14/07 8:15	104.5	4099611	16976
														1/0/00 16:42	105.0	4116575	16964
						m	10/15/07	123	0.500	45	78	0	0	10/15/07 7:55	105.5	4116575	0
														1/0/00 16:04	106.0	4129802	13227
						t	10/16/07	123	0.500	45	78	0	0	10/16/07 7:50	106.5	4129802	0
														1/0/00 16:12	107.0	4133640	3838
						w	10/17/07	108	0.500	45	63	0	0	10/17/07 9:07	107.5	4133640	0
														1/0/00 17:25	108.0	4143785	10145
						r	10/18/07	108	0.500	45	63	0	0	10/18/07 9:00	108.5	4155023	11238
														1/0/00 0:00	109.0	4155023	0
						f	10/19/07	267	0.500	45	127	69	26	10/19/07 12:50	109.5	4189305	34282
														1/0/00 19:00	110.0	4192100	2795
						sa	10/20/07	267	0.500	45	127	69	26	10/20/07 8:15	110.5	4202770	10670
														1/0/00 18:17	111.0	4221336	18566
7	10/21/07	133584	188140	105000	-54556	su	10/21/07	29	0.500	29	0	0	0	10/21/07 8:00	111.5	4233195	11859
														1/0/00 16:05	112.0	4251285	18090
						m	10/22/07	29	0.450	29	0	0	0	10/22/07 10:30	112.5	4277455	26170
														1/0/00 0:00	113.0	4277455	0
						t	10/23/07	26	0.450	26	0	0	0	10/23/07 0:00	113.5	4277455	0
														1/0/00 0:00	114.0	4277455	0
						w	10/24/07	26	0.450	26	0	0	0	10/24/07 0:00	114.5	4277455	0
														1/0/00 0:00	115.0	4277455	0
						r	10/25/07	26	0.450	26	0	0	0	10/25/07 0:00	115.5	4277455	0
														1/0/00 0:00	116.0	4277455	0
						f	10/26/07	26	0.450	26	0	0	0	10/26/07 0:00	116.5	4277455	0
														1/0/00 0:00	117.0	4277455	0
						sa	10/27/07	26	0.450	26	0	0	0	10/27/07 0:00	117.5	4277455	0
														1/0/00 0:00	118.0	4277455	0
						su	10/28/07	26	0.450	26	0	0	0	10/28/07 0:00	118.5	4277455	0
														1/0/00 0:00	119.0	4277455	0
						m	10/29/07	26	0.450	26	0	0	0	10/29/07 0:00	119.5	4277455	0
														1/0/00 0:00	120.0	4277455	0
						t	10/30/07	26	0.450	26	0	0	0	10/30/07 0:00	120.5	4277455	0
														1/0/00 0:00	121.0	4277455	0
						w	10/31/07	10	0.450	10	0	0	0	10/31/07 0:00	121.5	4277455	0
														1/0/00 0:00	122.0	4277455	0
						r	11/1/07	10	0.405	10	0	0	0	11/1/07 0:00	122.5	4277455	0
														1/0/00 0:00	123.0	4277455	0
						f	11/2/07	4	0.405	4	0	0	0	11/2/07 0:00	123.5	4277455	0
														1/0/00 0:00	124.0	4277455	0
						sa	11/3/07	4	0.405	4	0	0	0	#VALUE!	124.5	4277455	0
														1/0/00 0:00	125.0	4277455	0
						su	11/4/07	4	0.405	4	0	0	0	11/4/07 0:00	125.5	4277455	0
														1/0/00 0:00	126.0	4277455	0
						m	11/5/07	2	0.405	2	0	0	0	11/5/07 0:00	126.5	4277455	0
														1/0/00 0:00	127.0	4277455	0
						t	11/6/07	2	0.405	2	0	0	0	11/6/07 0:00	127.5	4277455	0
														1/0/00 0:00	128.0	4277455	0
						w	11/7/07	16	0.405	16	0	0	0	11/7/07 0:00	128.5	4277455	0
														1/0/00 0:00	129.0	4277455	0
						r	11/8/07	16	0.360	16	0	0	0	11/8/07 0:00	129.5	4277455	0
														1/0/00 0:00	130.0	4277455	0
						f	11/9/07	19	0.360	19	0	0	0	11/9/07 0:00	130.5	4277455	0
														1/0/00 0:00	131.0	4277455	0
						sa	11/10/07	19	0.360	19	0	0	0	11/10/07 0:00	131.5	4277455	0
														1/0/00 0:00	132.0	4277455	0
						su	11/11/07	29	0.360	29	0	0	0	11/11/07 0:00	132.5	4277455	0
														1/0/00 0:00	133.0	4277455	0
						m	11/12/07	29	0.360	29	0	0	0	11/12/07 0:00	133.5	4277455	0
														1/0/00 0:00	134.0	4277455	0
						t	11/13/07	31	0.360	31	0	0	0	11/13/07 0:00	134.5	4277455	0
														1/0/00 0:00	135.0	4277455	0
						w	11/14/07	31	0.360	31	0	0	0	11/14/07 0:00	135.5	4277455	0
														1/0/00 0:00	136.0	4277455	0

Water Production Records Not Resume
Yet after Fire Interruptio

		turn off irrigation systems		r	11/15/07	31	0.000	31	0	0	0	11/15/07 0:00	136.5	4277455	0
												1/0/00 0:00	137.0	4277455	0
				f	11/16/07	33	0.000	33	0	0	0	11/16/07 0:00	137.5	4277455	0
												1/0/00 0:00	138.0	4277455	0
				sa	11/17/07	33	0.000	33	0	0	0	11/17/07 0:00	138.5	4277455	0
												1/0/00 0:00	139.0	4277455	0
				su	11/18/07	32	0.000	32	0	0	0	11/18/07 0:00	139.5	4277455	0
												1/0/00 0:00	140.0	4277455	0
				m	11/19/07	32	0.000	32	0	0	0	11/19/07 0:00	140.5	4277455	0
												1/0/00 0:00	141.0	4277455	0
				t	11/20/07	35	0.000	35	0	0	0	11/20/07 0:00	141.5	4277455	0
												1/0/00 0:00	142.0	4277455	0
		Resume Production Record-keepin		w	11/21/07	22	0.000	22	0	0	0	11/21/07 0:00	142.5	4277455	0
												1/0/00 0:00	143.0	4277455	0
				r	11/22/07	25	0.000	25	0	0	0	11/22/07 9:41	143.5	5127409	849954
												1/0/00 0:00	144.0	5127409	0
				f	11/23/07	134	0.000	45	89	0	0	11/23/07 8:52	144.5	5140891	13482
												1/0/00 0:00	145.0	5140891	0
				sa	11/24/07	134	0.000	45	89	0	0	11/24/07 13:41	145.5	5160404	19513
												1/0/00 0:00	146.0	5160404	0
				su	11/25/07	27	0.000	27	0	0	0	11/25/07 7:50	146.5	5166636	6232
												1/0/00 0:00	147.0	5166636	0
				m	11/26/07	27	0.000	27	0	0	0	11/26/07 8:43	147.5	5184063	17427
												1/0/00 0:00	148.0	5184063	0
				t	11/27/07	27	0.000	27	0	0	0	11/27/07 7:45	148.5	5206101	22038
												1/0/00 0:00	149.0	5206101	0
7	11/28/07	92576	36540	0	56036	w	11/28/07	27	0.000	27	0	0	0	11/28/07 9:30	149.5	5219979	13878
												1/0/00 0:00	150.0	5219979	0
				r	11/29/07	29	0.000	29	0	0	0	11/29/07 8:10	150.5	5219979	0
												1/0/00 0:00	151.0	5219979	0
				f	11/30/07	52	0.000	45	7	0	0	11/30/07 8:00	151.5	5242181	22202
												1/0/00 0:00	152.0	5242181	0
				sa	12/1/07	52	0.000	45	7	0	0	12/1/07 8:00	152.5	5242181	0
												1/0/00 0:00	153.0	5242181	0
				su	12/2/07	22	0.000	22	0	0	0	12/2/07 8:05	153.5	5256919	14738
												1/0/00 0:00	154.0	5256919	0
				m	12/3/07	53	0.000	45	8	0	0	12/3/07 8:10	154.5	5256919	0
												1/0/00 0:00	155.0	5256919	0
				t	12/4/07	53	0.000	45	8	0	0	12/4/07 9:45	155.5	5269834	12915
												1/0/00 0:00	156.0	5269834	0
7	12/5/07	49855	28400	0	21455	w	12/5/07	29	0.000	29	0	0	0	12/5/07 7:50	156.5	5269834	0
												1/0/00 0:00	157.0	5269834	0
				r	12/6/07	29	0.000	29	0	0	0	12/6/07 7:55	157.5	5269834	0
												1/0/00 0:00	158.0	5269834	0
				f	12/7/07	29	0.000	29	0	0	0	12/7/07 9:30	158.5	5282711	12877
												1/0/00 0:00	159.0	5282711	0
				sa	12/8/07	29	0.000	29	0	0	0	12/8/07 8:43	159.5	5282711	0
												1/0/00 0:00	160.0	5282711	0
				su	12/9/07	29	0.000	29	0	0	0	12/9/07 8:20	160.5	5282711	0
												1/0/00 0:00	161.0	5282711	0
				m	12/10/07	29	0.000	29	0	0	0	12/10/07 9:30	161.5	5282711	0
												1/0/00 0:00	162.0	5282711	0
				t	12/11/07	69	0.000	45	24	0	0	12/11/07 13:30	162.5	5289551	6840
												1/0/00 0:00	163.0	5289551	0
7	12/12/07	19717	27340	0	-7623	w	12/12/07	69	0.000	45	24	0	0	12/12/07 9:55	163.5	5289551	0
												1/0/00 0:00	164.0	5289551	0
				r	12/13/07	83	0.000	45	38	0	0	12/13/07 8:04	164.5	5303370	13819
												1/0/00 0:00	165.0	5303370	0
				f	12/14/07	152	0.000	45	107	0	0	12/14/07 9:30	165.5	5303370	0
												1/0/00 0:00	166.0	5303370	0
				sa	12/15/07	132	0.000	45	87	0	0	12/15/07 8:03	166.5	5315131	11761
												1/0/00 0:00	167.0	5315131	0
				su	12/16/07	29	0.000	29	0	0	0	12/16/07 8:10	167.5	5315131	0
												1/0/00 0:00	168.0	5315131	0
				m	12/17/07	142	0.000	45	97	0	0	12/17/07 8:23	168.5	5328428	13297
												1/0/00 0:00	169.0	5328428	0
				t	12/18/07	142	0.000	45	97	0	0	12/18/07 9:18	169.5	5328428	0
												1/0/00 0:00	170.0	5328428	0
7	12/19/07	52353	62380	0	-10027	w	12/19/07	29	0.000	29	0	0	0	12/19/07 10:15	170.5	5341904	13476
												1/0/00 0:00	171.0	5341904	0
				r	12/20/07	29	0.000	29	0	0	0	12/20/07 11:05	171.5	5341904	0
												1/0/00 0:00	172.0	5341904	0
				f	12/21/07	118	0.000	45	73	0	0	12/21/07 9:00	172.5	5341904	0
												1/0/00 0:00	173.0	5341904	0
				sa	12/22/07	118	0.000	45	73	0	0	12/22/07 9:56	173.5	5341904	0
												1/0/00 0:00	174.0	5341904	0
				su	12/23/07	29	0.000	29	0	0	0	12/23/07 0:00	174.5	5341904	0
												1/0/00 0:00	175.0	5341904	0
				m	12/24/07	29	0.000	29	0	0	0	12/24/07 0:00	175.5	5341904	0
												1/0/00 0:00	176.0	5341904	0
				t	12/25/07	24	0.000	24	0	0	0	12/25/07 0:00	176.5	5341904	0
												1/0/00 0:00	177.0	5341904	0
				w	12/26/07	318	0.000	45	127	69	77	12/26/07 9:00	177.5	5341904	0
												1/0/00 0:00	178.0	5341904	0
				r	12/27/07	318	0.000	45	127	68	77	12/27/07 9:00	178.5	5358297	16393
												1/0/00 0:00	179.0	5358297	0
				f	12/28/07	219	0.000	45	127	47	0	12/28/07 0:00	179.5	5358297	0
												1/0/00 0:00	180.0	5358297	0
				sa	12/29/07	57	0.000	45	12	0	0	12/29/07 9:00	180.5	5384599	26302
												1/0/00 0:00	181.0	5384599	0
				su	12/30/07	90	0.000	45	45	0	0	12/30/07 0:00	181.5	5384599	0
												1/0/00 0:00	182.0	5384599	0
12	12/31/07	58205	114680	0	-56475	m	12/31/07	90	0.000	45	45	0	0	12/31/07 9:10	182.5	5400109	15510
												1/0/00 0:00	183.0	5400109	0

Table B-3. Seasonal Irrigation Demand

ET rate, CIMIS zone 9

	in/mo	"use factor"
july	7.44	1.00
aug	6.82	0.92
sept	5.70	0.77
oct	4.03	0.54
nov	2.70	0.36

	in/mo	"use factor"
mar	4.03	0.54
april	5.1	0.69
may	5.89	0.79
june	6.6	0.89

9 months irrigation: 0.72 avg use factor (comparison with July)

	week	weeks	factor
july	1.00	1.00	1.000
	2.00	2.00	**1.000**
	3.00	3.00	0.980
	4.00	4.00	0.960
aug	1.00	5.00	0.940
	2.00	6.00	**0.920**
	3.00	7.00	0.870
	4.00	8.00	0.845
sept	1.00	9.00	0.808
	2.00	10.00	**0.770**
	3.00	11.00	0.720
	4.00	12.00	0.670
oct	1.00	13.00	0.610
	2.00	14.00	**0.540**
	3.00	15.00	0.500
	4.00	16.00	0.450
nov	1.00	17.00	0.405
	2.00	18.00	**0.360**

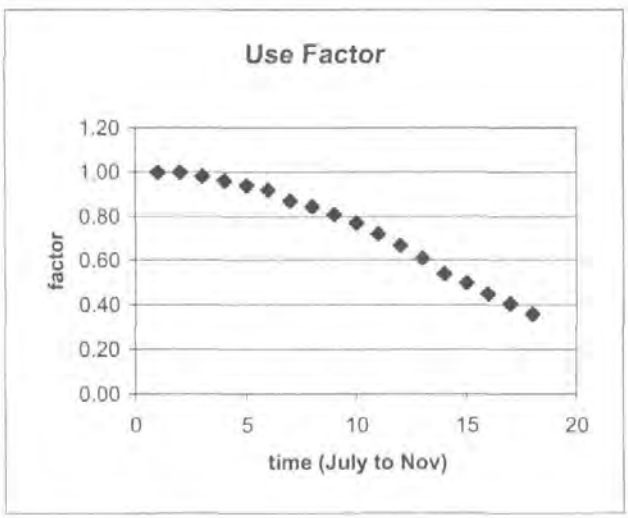


Table B-4. Current and Future PCCC Water Demand Estimates

	Current	Future	Current Water Use by Type, gpd/person: Residential 100	Motel 80	Dorm+ 60	Dorm 40	Future Water Use by Type, gpd/person: Residential 100	Motel 80	Dorm+ 60	Dorm 40
STAFF										
Existing Staff	45		45				45			
Expanded Staff		24					24			
RV Parking (2 persons/RV)	20			20				20		
GUESTS										
Palomar	99					99				99
Kerrigil	60				60				60	
Kerrigil Expansion		32							32	
AJ	32					32				32
Davis	32					32				32
Stella	9				9				9	
Asher	2			2				2		
Spruce	105			105				105		
New: Strawberry Flats		104						104		
Future Reserved (max 485)		10						10		
Current Total	404		45	127	69	163	69	241	101	163
Expansion		170				339 guests				485 guests
total		574								
total w/o staff*		485	current utilization rates: 100%	67%	37%	10%	max daily water demands (gallons/day): 6,900	19,280	6,060	6,520
			avg daily water demand (gallons/day): 4,500	8,563	2,566	1,623				

*maximum per permit is 485

Current

Staff&Guest	19.3	
return flows	(15.5)	Acft/yr
Irrigation	30,000	July use est., gpd
	9	months
	0.72	avg ET vs. July
Annual:	17.9	Acft
NET TOTAL	**22**	Acft/yr

Future (max)

Staff&Guest	43.4	Acft/yr
return flows	(34.7)	Acft/yr
Current Irr.	17.9	Acft/yr
+50% exp.	8.9	Acft/yr
NET TOTAL	**36**	Acft/yr

2007 Pumping Est.	33.0	Acft/yr
Calculated Above	37.2	Acft/yr
	113%	(+13% high)

Future Pumping Est. **70** Acft/yr

Table B-5 Estimated Water Demand, Palomar Mountain State Park

	n	gpd	days**	gal/yr	Acft/yr	notes
Palomar School*						
daytime students	300	25	250	1,875,000	5.75	
adult faculty	30	120	250	900,000	2.76	
pool					0.52	see below.
Palomar State Park****						
resident staff	25	120	365	1,095,000	3.36	
Cedar Grove CG	55	20	365	401,500	1.23	55 person limit
Doane Valley CG	31	50	365	565,750	1.74	31 campsites
miscell, fire pond evap.				1,466,230	4.50	one acre of irrig equivalent

total	6,303,480	gals
	6.0	gpm/well***
	19.86	Acft/yr Maximum
	5.80	Acft/yr 2008 Use

Notes:

* the school has no outdooor irrigation demand. A 50x100 ft swimming pool will lose approximately 0.5 Acft of water per year at an evaporation rate of 4.5 ft/yr

** the estimate is for 100% occupancy. The State park is relatively inactive during wintertime.

***the state park operates two wells. The total flow is compared to the hypothetical flow rate required to sustain the water supply. The wells are likely capable of 6 gpm.

****Day visitor water demand is are assumed samll compared to campground demand

Reported Rates (Valley Well, supply for Palomar School and Doane Valley CG)

May 5 to Dec 21, 2007	3,148,800	gallons	230 (days)	5/5/2007	12/21/2007
(included fire fighting)	9.66	Acft			
2008					
Silvercrest Well	1,200,000	gallons			
Doane Valley	690,720	gallons			
(no fire fighting demand)	5.80	Acft			

Rates obtained from Randy Burt and Chris Ruiz, Palomar State Park Personnel (per comm, 2009)

APPENDIX C.
PCCC Well Logs

ORIGINAL
File with DWR

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 745241

Owner's Well No. 18

Date Work Began 7/26/01 Ended 7/26/01

Local Permit Agency San Diego County Dept. of Env. Health

Permit No. W64309 Permit Date 7/25/01

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) ___ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD ___ FLUID ___

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
	Fill well with gravel:
	27 - 242' (total depth)
	Fill well with concrete:
	7 - 27'.
	Remove casing and backfill with
	native soil & compact:
	Ground level - 7'

TOTAL DEPTH OF BORING 242 (Feet)

TOTAL DEPTH OF COMPLETED WELL ___ (Feet)

WELL OWNER

Name Palomar Christian Conference Center

Mailing Address P. O. Box 160

Palomar Mtn. CA 92060
CITY STATE ZIP

WELL LOCATION

Address 34764 Doone Valley Rd.

City Palomar Mountain

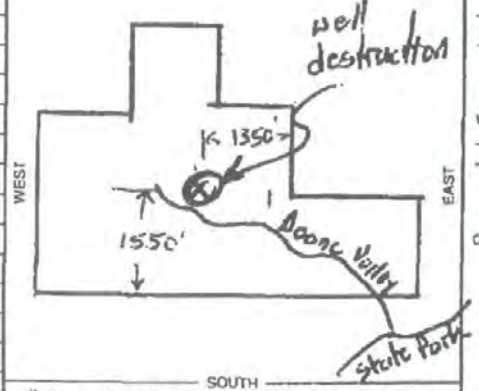
County San Diego

APN Book 112 Page 160 Parcel 03-00

Township 9S Range 1E Section 31

Latitude ___ DEG. ___ MIN. ___ SEC. NORTH Longitude ___ DEG. ___ MIN. ___ SEC. WEST

LOCATION SKETCH



Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

___ NEW WELL

MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)

X DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)

WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial

___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL ___ (Ft.) & DATE MEASURED ___

ESTIMATED YIELD * ___ (GPM) & TEST TYPE ___

TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)

* *May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE: CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME HIDDEN VALLEY PUMP SYSTEMS, INC.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

31248 Valley Center Road, Valley Center, CA 92082
ADDRESS CITY STATE ZIP

Signed Kurtis L. Sweet
(WELL DRILLER/AUTHORIZED REPRESENTATIVE)

7/27/01
DATE SIGNED

487325
C-57 LICENSE NUMBER

DWR 188 REV. 11-87

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

ORIGINAL
File with DWR

PAGE 1

3 1 1971

Do Not Fill In

No 61869

State Well No. 16S/1W-00

Other Well No.

(1) OWNER:

Name PALOMAR BAPTIST CAMP, INC.
Address 930 10th AVE.
SAN DIEGO, CALIF. 92101

(2) LOCATION OF WELL:

County SAN DIEGO Owner's number, if any
Township, Range, and Section MT. PALOMAR
Distance from cities, roads, railroads, etc.

(3) TYPE OF WORK (check):

New Well [X] Deepening [ ] Reconditioning [ ] Destroying [ ]
If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic [ ] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [X]

(5) EQUIPMENT:

Rotary AIR [X]
Cable [ ]
Other [ ]

(6) CASING INSTALLED:

STEEL: OTHER:
SINGLE [X] DOUBLE [ ]

From ft.	To ft.	Diam.	Gage or Wall
0	41.6	7" O.D.	.231

If gravel packed

Diameter of Bore	From ft.	To ft.
6.320		

Size of shoe or well ring:
Size of gravel: NONE
Describe joint WELD

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
	NONE			

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes [X] No [ ] To what depth ft.
Were any strata sealed against pollution? Yes [ ] No [X] If yes, note depth of strata
From ft. to ft.
From ft. to ft.
Method of sealing CEMENT GROUT

(9) WATER LEVELS:

Depth at which water was first found, if known ft.
Standing level before perforating, if known UNKNOWN ft.
Standing level after perforating and developing ft.

(10) WELL TESTS:

Was pump test made? Yes [X] No [ ] If yes, by whom R.E. ANDERSON
Yield: 2.5 gal./min. with ft. drawdown after hrs.
Temperature of water UNK Was a chemical analysis made? Yes [ ] No [X]
Was electric log made of well? Yes [ ] No [X] If yes, attach copy

(11) WELL LOG:

Total depth 468 ft. Depth of completed well 468 ft.
Formation: Describe by color, character, size of material, and structure

ft.	to ft.	
0	5	ALUVIUM
5	18	DECOMPOSED
18	26	TIGHT CLAY
26	40	DECOMPOSED
40	55	GRANITE
55	59	DECOMPOSED
59	64	GRANITE
65	79	GRANITE
79	80	FRACTURED
80	91	GRANITE
91	92	FRACTURED
92	96	GRANITE
96	98	FRACTURED
98	110	GRANITE
110	111	FRACTURED
111	125	GRANITE
125	126	FRACTURED
126	137	GRANITE
137	138	FRACTURED
138	168	GRANITE
168	169	FRACTURED
169	190	GRANITE
190	191	FRACTURED
191	196	GRANITE
196	197	FRACTURED
197	226	GRANITE
226	227	FRACTURED
227	245	GRANITE
245	246	FRACTURED
246	261	GRANITE
261	263	FRACTURED
263	280	GRANITE
280	281	FRACTURED
281	311	GRANITE
311	312	FRACTURED
312	333	GRANITE
333	334'6"	FRACTURED (CONT'D)

CONFIDENTIAL - NOT FOR PUBLIC RELEASE

Work started 8-6- 71 Completed 8-13 1971

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME R.E. ANDERSON, INC.
(Person, firm, or corporation) (Typed or printed)
Address 10303 CHANNEL RD. LAKESIDE, CA.
[SIGNED] R E Anderson
(Well Driller)
License No. A 227780 Dated AUG. 23, 1971

SKETCH LOCATION OF WELL ON REVERSE SIDE

DWR 188 (REV. 9-68)

25179-930 9-68 30M TRIP AD OSP

X

G1869
Do Not Fill In

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

~~No 61870~~

State Well No. _____

Other Well No. _____

ORIGINAL
File with DWR

PAGE 2

AUG 31 1971

(1) OWNER:

Name PALOMAR BAPTIST CAMP, INC.

Address 930 10th AVE

SAN DIEGO, CALIF. 92101

(2) LOCATION OF WELL:

County SAN DIEGO Owner's number, if any

Township, Range, and Section

Distance from cities, roads, railroads, etc. MT. PALOMAR

(3) TYPE OF WORK *(check)*:

New Well [X] Deepening [ ] Reconditioning [ ] Destroying [ ]

If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE *(check)*:

Domestic [ ] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [X]

(5) EQUIPMENT:

Rotary AIR [X]
Cable [ ]
Other [ ]

(6) CASING INSTALLED:

STEEL: OTHER:

SINGLE [X] DOUBLE [ ]

From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.
0	41.6	7" O.D.	.23	6.320		

If gravel packed

Size of shoe or well ring:

Size of gravel: NONE

Describe joint WELD

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
	NONE			

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes [X] No [ ] To what depth ft.

Were any strata sealed against pollution? Yes [ ] No [X] If yes, note depth of strata

From ft. to ft.

From ft. to ft.

Method of sealing CEMENT GROUT

(9) WATER LEVELS:

Depth at which water was first found, if known ft.

Standing level before perforating, if known UNKNOWN ft.

Standing level after perforating and developing ft.

(10) WELL TESTS:

Was pump test made? Yes [X] No [ ] If yes, by whom? R.E. ANDERSON

Yield: 2.5 gal./min. with ft. drawdown after hrs.

Temperature of water UNK Was a chemical analysis made? Yes [ ] No [X]

Was electric log made of well? Yes [ ] No [X] If yes, attach copy

(11) WELL LOG:

Total depth 468 ft. Depth of completed well 468 ft.

Formation: *Describe by color, character, size of material, and structure*

	ft. to	ft.
(CONT'D)		
334'6" - 358	GRANITE	
358 - 359	FRACTURED	
359 - 379	GRANITE	
379 - 380	FRACTURED (6.6 GPM)	
380 - 410	GRANITE	
410 - 411	FRACTURED	
411 - 437	GRANITE	
437 - 438	FRACTURE	
438 - 441	GRANITE	
441 - 442	FRACTURE	
442 - 454	GRANITE	
454 - 455	FRACTURE	
455 - 465	GRANITE	
465 - 466	FRACTURE	
466 - 468	GRANITE	

CONFIDENTIAL - NOT FOR PUBLIC RELEASE

BOTTOM BORE BIT SIZE: 6.320

Work started 8-6 19 71 , Completed 8-13 19 71

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME R.E. ANDERSON, INC.
(Person, firm, or corporation) (*Typed or printed*)

Address 10303 CHANNEL RD. LAKESIDE, CA.

[SIGNED] R E Anderson
(Well Driller)

License No. A 227780 Dated AUG. 23, 19 71

SKETCH LOCATION OF WELL ON REVERSE SIDE

DWR 188 (REV. 9-68)

25179-950 9-68 50M TRIP △D OSP

ORIGINAL

File with DWR

FEB 2 0 1977

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

Do not fill
No. 01376

Notice of Intent No. 1359
Permit No. or Date 1743

State Well No. 9S/1E-31K
Other Well No.

(1) **OWNER:** Name PALOMAR BAPTIST CAMP
Address 930 10th AVE.
City SAN DIEGO, CA. Zip 92101

(2) **LOCATION OF WELL** (See instructions):
County SAN DIEGO Owner's Well Number
Well address if different from above PALOMAR MOUNTAIN
Township 9 Range 1E Section 31
Distance from cities, roads, railroads, fences, etc. PALOMAR MT. STATE PARK

WELL LOCATION SKETCH

(3) **TYPE OF WORK:**
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) **PROPOSED USE:**
Domestic ☐
Irrigation ☐
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other COMMERCIAL

(5) **EQUIPMENT:**
Rotary ☒ Reverse ☐
Cable ☐ Air ☐
Other ☐ Bucket ☐

(6) **GRAVEL PACK:**
Yes ☐ No ☒ Size
Diameter of bore 6 3/4
Packed from ft. to ft.

(7) **CASING INSTALLED:**
Steel ☒ Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall
0	50	8 5/8	.188

(8) **PERFORATIONS:** NONE
Type of perforation or size of screen

From ft.	To ft.	Slot size

(9) **WELL SEAL:**
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 50 ft.
Were strata sealed against pollution? Yes ☐ No ☒ Interval ft.
Method of sealing CEMENT GROUT

(10) **WATER LEVELS:**
Depth of first water, if known ft.
Standing level after well completion 85 ft.

(11) **WELL TESTS:** REX ANDERSON
Was well test made? Yes ☒ No ☐ If yes, by whom?
Type of test Pump ☐ Bailer ☐ Air lift ☒
Depth to water at start of test ft. At end of test ft.
Discharge 50 gal/min after hours Water temperature UNK
Chemical analysis made? Yes ☐ No ☒ If yes, by whom?
Electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) **WELL LOG:** Total depth 300 ft. Depth of completed well 300 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	20	D./GRANITE
20	52	SOFT GRANITE
52	85	HARD GRANITE
85	86	FRACTURE
86	132	HARD GRANITE
132	134	FRACTURE 3 GPM
134	145	HARD GRANITE
145	146	FRACTURE 2 GPM
146	161	HARD GRANITE
161	162	FRACTURE 4 GPM
162	205	HARD GRANITE
205	206	FRACTURE 3 GPM
206	211	HARD GRANITE
211	212	FRACTURE 3 GPM
212	218	HARD GRANITE
218	219	FRACTURE 35 GPM
219	226	HARD GRANITE
226	227	FRACTURE
227	280	HARD GRANITE
280	286	HARD GRANITE
286	287	FRACTURE
287	300	HARD GRANITE

Work started 10-28-76 19 Completed 11-14-76 19

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
SIGNED Rex E. Anderson (Well Driller)
NAME REX ANDERSON CORP.
(Person, firm, or corporation) (Typed or printed)
Address 10303 CHANNEL RD.
City LAKESIDE, CA. Zip 92040
License No. A 305739 Date of this report JAN. 6, 19

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM 45816-950 7-76 50M QUAD

ORIGINAL
File with DWR

Page 1 of 1

Owner's Well No. #3 (?)

Date Work Began 7/7/03 Ended 7/8/03

Local Permit Agency S.D. Co. Dept. of environmental Health

Permit No. LWEL 15445 Permit Date 07/14/03

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 757685

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) XX VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD N/A FLUID

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	300'	Existing well- see attached copy of original water well driller's report
		* Run tools to bottom of hole and install PVC liner

TOTAL DEPTH OF BORING 300 (Feet)

TOTAL DEPTH OF COMPLETED WELL 300 (Feet)

WELL OWNER

Name Palomar Baptist Camp, Inc.

Mailing Address P.O. Box 160

Palomar Mountain, Ca. 92060

CITY STATE ZIP

WELL LOCATION

Address 34764 Doane Valley Road (State Park Rd.)

City Palomar Mountain, Ca. 92060

County San Diego

APN Book 112 Page 160 Parcel 04

Township 9S Range 1E Section 31

Latitude ___ DEG. ___ MIN. ___ SEC. NORTH Longitude ___ DEG. ___ MIN. ___ SEC. WEST

LOCATION SKETCH

NORTH

WEST EAST

SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

___ NEW WELL

MODIFICATION/REPAIR

* XX Deepen

XX Other (Specify)

___ DESTROY (*Describe Procedures and Materials Under "GEOLOGIC LOG"*)

PLANNED USES (✓)

WATER SUPPLY

___ Domestic XX Public

___ Irrigation ___ Industrial

___ MONITORING

___ TEST WELL

___ CATHODIC PROTECTION

___ HEAT EXCHANGE

___ DIRECT PUSH

___ INJECTION

___ VAPOR EXTRACTION

___ SPARGING

___ REMEDIATION

___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 132 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 85 (Ft.) & DATE MEASURED orginal

ESTIMATED YIELD * 50 (GPM) & TEST TYPE air lift

TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)

** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	50	12")	X				steel	7"	.188	
0	300	6.2"	X	X			PVC liner	4.570	cl.160	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE+SIZE)
0	50	XXX			Type I-II
240	300				

ATTACHMENTS (✓)

X ORIGINAL LOG

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

X Other MAP

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Acme Drilling Co. Inc. (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 748 S. Vinewood St.-Suite B-Escondido, Ca. 92029-1929

CITY STATE ZIP

Signed [signature] (WELL DRILLER/AUTHORIZED REPRESENTATIVE)

DATE SIGNED 7/18/03

C-57 LICENSE NUMBER 526886

DWR 188 REV 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ORIGINAL
File with DWR

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in

No. 287660

Notice of Intent No. _____ State Well No. _____
Local Permit No. or Date _____ Other Well No. _____

(1) OWNER: Name Palomar Baptist Camp, Inc.
Address P. O. Box 23667
City San Diego, CA ZIP 92123

(2) LOCATION OF WELL (See instructions):
County San Diego Owner's Well Number _____
Well address if different from above Palomar Mt., CA.
Township 9S Range 1E Section 31
Distance from cities, roads, railroads, fences, etc.
See Attached

WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well [X] Deepening [ ]
Reconstruction [ ]
Reconditioning [ ]
Horizontal Well [ ]
Destruction [ ] (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic [ ]
Irrigation [ ]
Industrial [X]
Test Well [ ]
Municipal [ ]
Other [ ]
(Describe)

(5) EQUIPMENT:
Rotary [X] Reverse [ ]
Cable [ ] Air [X]
Other [ ] Bucket [ ]

(6) GRAVEL PACK:
Yes [ ] No [X] Size _____
Diameter of bore 9 7/8
Packed from _____ ft. to _____ ft.

(7) CASING INSTALLED:
Steel [X] Plastic [ ] Concrete [ ]

From ft.	To ft.	Dia. in.	Gage or Wall
0	60	7	.188

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Slot size

(9) WELL SEAL:
Was surface sanitary seal provided? Yes [X] No [ ] If yes, to depth 50 ft.
Were strata sealed against pollution? Yes [ ] No [X] Interval _____ ft.
Method of sealing Cement Grout

(10) WATER LEVELS:
Depth of first water, if known _____ ft.
Standing level after well completion 79'10" ft.

(11) WELL TESTS:
Was well test made? Yes [X] No [ ] If yes, by whom? R. Anderson
Type of test Pump [ ] Bailer [ ] Air lift [X]
Depth to water at start of test _____ ft. At end of test _____ ft.
Discharge 50 gal/min after _____ hours Water temperature _____
Chemical analysis made? Yes [ ] No [X] If yes, by whom? _____
Was electric log made Yes [ ] No [X] If yes, attach copy to this report

(12) WELL LOG: Total depth _____ ft. Completed depth 365 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	7	Soil zone
7	54	D.G. becoming firmer w/depth.
54	82	Moderately hard granite gneiss.
82	105	Granite gneiss softer. It is fine grained, dark colored, & almost a schist.
105	308	Moderately hard granite gneiss.
308	320	Granite gneiss becomes harder
320	365	Rock goes back to being moderately hard.
		120' Trace of water showing.
		165' Well tested at 30 gpm
		250' Well tested at 50 gpm.
		215 Fractured area w/quartz.

Work started 3/21 19 89 Completed 3/23 19 89

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Signed Rex E. Anderson II (Well Driller)
NAME REX ANDERSON CORP. (Person, firm, or corporation) (Typed or printed)
Address P. O. Box 384
City Julian, CA ZIP 92036
License No. 305739 Date of this report 3/31/89

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

No 287660

COUNTY OF SAN DIEGO
DEPARTMENT OF HEALTH SERVICES

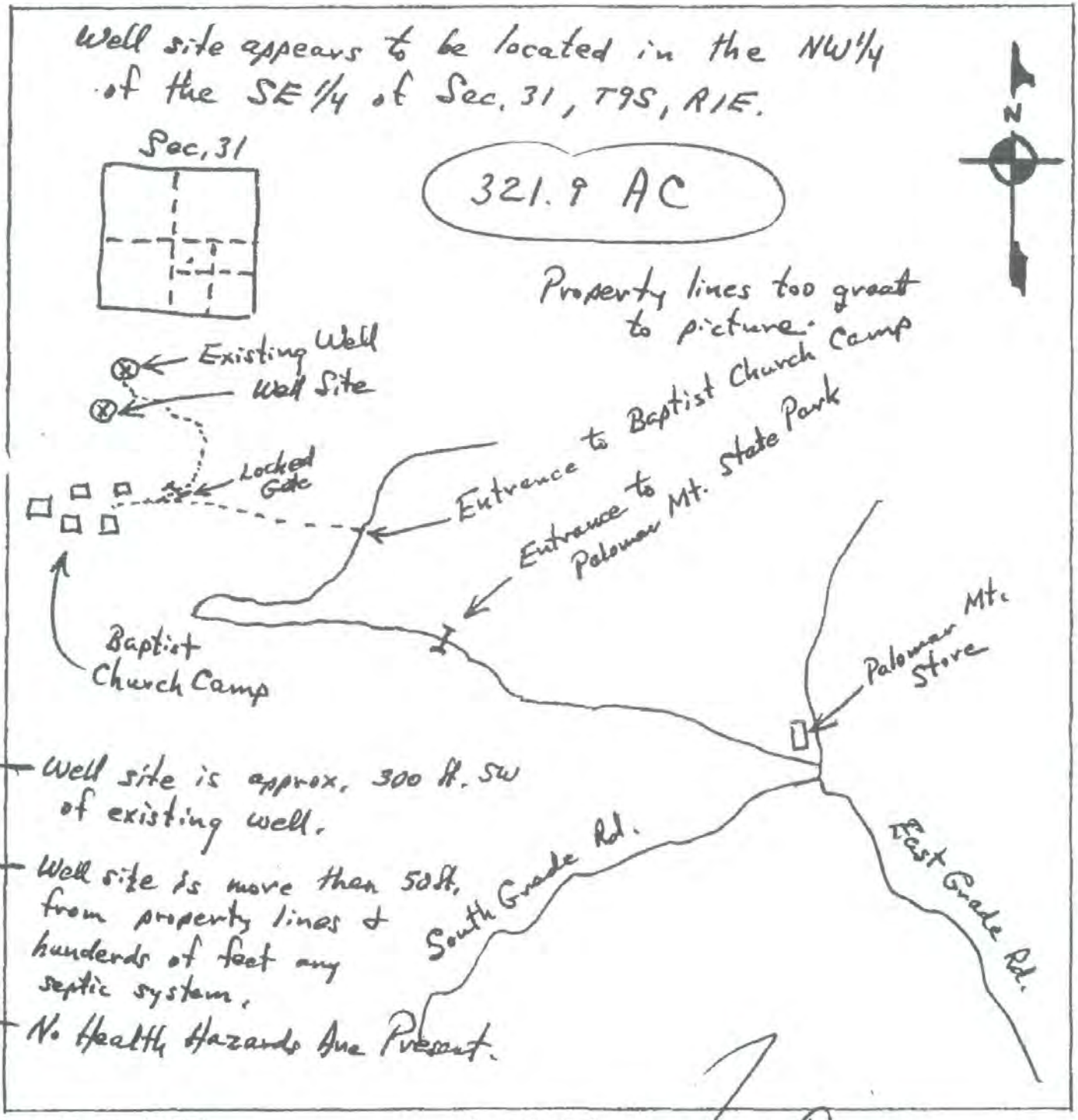
WELL PERMIT APPLICATION

Control # _____

Assessor's Parcel No. 112-160-03-(

LOCATION

INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.



DHS:EHP-731 (3/85)

R E Anderson

ORIGINAL
File with DWR

Page ___ of ___

Owner's Well No. ___

Date Work Began 7/2/91 , Ended 7/19/91

Local Permit Agency San Diego County Health Dept.

Permit No. W61576 Permit Date 4/22/91

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 479572

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DEPTH TO FIRST WATER 108 (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	4	Loose sandy soil + small rocks.
4	8	Large rocks
8	12	Sandy soil + rocks
12	28	Decomposed granite
28	52	Granite w/broken areas
52	58	Granite
58	63	Hard decomposed granite (damp)
63	75	Granite
75	81	Fractural + faulted (slight flow)
81	136	Granite w/fractures @ 94, 98, 108 (15 gpm), 111.
136	154	Highly fractured w/fault goudge blowing up to 300± gpm. Went artesian @ 145' rod change 120 gpm to starts. Down to 75 gpm when pulled out.
165	191	Granite w/many fractures
191	205	Granite

TOTAL DEPTH OF BORING 205 (Feet)

TOTAL DEPTH OF COMPLETED WELL 205 (Feet)

WELL OWNER

Name Palomar Baptist Camp

Mailing Address 15234 Del Poniente Ct.

CITY Poway, CA 92064 STATE ZIP

WELL LOCATION

Address Palomar Baptist Camp

City Palomar Mnt., CA

County San Diego

APN Book ___ Page ___ Parcel ___

or Township 9S Range 1E Section 31

or Latitude ___ DEG. ___ MIN. ___ SEC. NORTH Longitude ___ DEG. ___ MIN. ___ SEC. WES

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)
X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materi Under "GEOLOGIC LO
PLANNED USE(S (✓)
___ MONITORING
WATER SUPPLY
___ Domestic
___ Public
___ Irrigation
___ Industrial
___ "TEST WELL"
___ CATHODIC PROTE TION
___ OTHER (Specify)
Camp well

DRILLING METHOD Air Rotary FLUID ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL Artesian (Ft.) & DATE MEASURED 7/19/91

ESTIMATED YIELD* 200+ (GPM) & TEST TYPE air lift

TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)

* *May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	55	6.407	X				Steel	6.5	.188	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	50	X			

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
X Other ~~Location map~~

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belie

NAME Rex Anderson Corp. (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS P. O. Box 384, CITY Julian, STATE Ca ZIP 92036

Signed H. E. Anderson (WELL DRILLER/AUTHORIZED REPRESENTATIVE) DATE SIGNED 7/30/90

C-57 LICENSE NUMBI A305739

DWR 188 REV 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

479572

COUNTY OF SAN DIEGO
DEPARTMENT OF HEALTH SERVICES

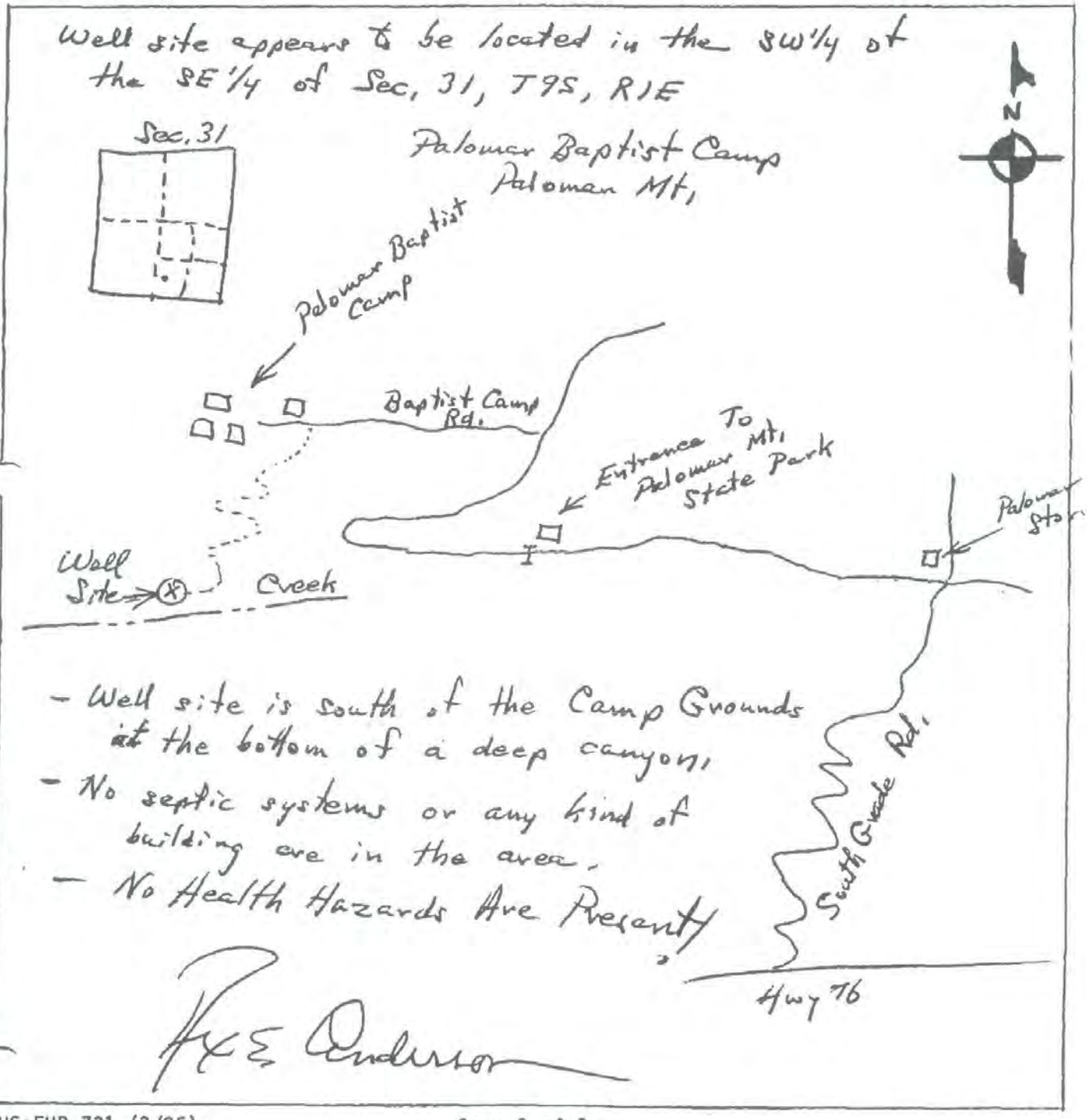
WELL PERMIT APPLICATION

Control # _____

Assessor's Parcel No. 112-160-04-0
112-160-03-0
112-160-02-0

LOCATION

INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.



STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 463758

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Owner's Well No. One

Date Work Began 4/11/95 Ended 4/17/95

Local Permit Agency Health Dept

Permit No. W 062940 Permit Date 4/15/95

GEOLOGIC LOG

ORIENTATION (✓) — VERTICAL — HORIZONTAL — ANGLE — (SPECIFY)

DEPTH TO FIRST WATER 30 (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	4	top soil - dark brown
4	36	clayey decomposed granite brown color
36	106	Semi weathered and decomposed granite with clay in fractures overall color grey
106	250	soft, broken granite - grey color

Completed Well Construction

Date 2-2-96

Date Inspected 2-2-96

Comments Final approval pending on approved H20 sample

Water Sample Taken? No

Reviewed By M. Sadzik

TOTAL DEPTH OF BORING 250 (Feet)

TOTAL DEPTH OF COMPLETED WELL 250 (Feet)

WELL OWNER

Name Forest Mckinley

Mailing Address 12837 Camino Ramillette

City San Diego 92128 STATE ZIP

WELL LOCATION

Address State Park Rd & Palomar Vista rd.

City Palomar Mt

County San Diego

APN Book 134 Page 131 Parcel 02

Township 10S Range 1E Section 9

Latitude DEG. MIN. SEC. NORTH Longitude DEG. MIN. SEC. WEST

LOCATION SKETCH

Illustrate or Describe Distance of Well from landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

✓ NEW WELL

MODIFICATION/REPAIR

— Deepen

— Other (Specify)

— DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

PLANNED USE(S) (✓)

— MONITORING

WATER SUPPLY

X Domestic

— Public

— Irrigation

— Industrial

— "TEST WELL"

— CATHODIC PROTECTION

— OTHER (Specify)

DRILLING METHOD Rotary FLUID air & water

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL 30 (Ft.) & DATE MEASURED 4/17/95

ESTIMATED YIELD* 10 (GPM) & TEST TYPE airlift

TEST LENGTH 3 (Hrs.) TOTAL DRAWDOWN 200 (Ft.)

** May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL/ GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	96	10	X				A-53	6	.188	
0	134	6	X				F480	4.5	Sch 40	
134	194	6		X			F480	4.5	Sch 40	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	20	X			
20	95		X		

ATTACHMENTS (✓)

— Geologic Log

— Well Construction Diagram

— Geophysical Log(s)

— Soil/Water Chemical Analyses

— Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME (PERSON, FIRM OR CORPORATION) Fain Drilling & Pump Co Inc.

ADDRESS 12029 Old Castle Rd. CITY Valley Center, STATE Ca ZIP 92082

Signed Joe R Fain WELL DRILLER/AUTHORIZED REPRESENTATIVE

DATE SIGNED 4/19/95

C-57 LICENSE NUMBER 328287

DWR 188 REV. 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

Orig in SM 6/23/95 M

No. One

No. 463716

Work Began 3-30-95, Ended 4-4-95

Local Permit Agency S. D. County Health Dept.

Permit No. W62936 Permit Date 3/27/95

DWR USE ONLY — DO NOT FILL I

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DEPTH TO FIRST WATER 5 (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	85	soft, sandy decomposed granite
25	110	weathered granite
110	112	Fracture zone (water)
112	242	weathered granite - grey color
242	244	fracture (water)
244	260	hard granite - grey color

Completed Well Construction

Date 8-2-95

Date Inspected 8-1-95

Comments Well cap + seal to code

Water Sample Taken? No

Reviewed By: P. Mo

TOTAL DEPTH OF BORING 260 (Feet)

TOTAL DEPTH OF COMPLETED WELL 260 (Feet)

WELL OWNER

Name Roy H. Davis

Mailing Address 7450 Keisha Terrace

City San Diego, California 92126 State Zi

WELL LOCATION

Address Palomar Vista Rd

City Palomar Mt.

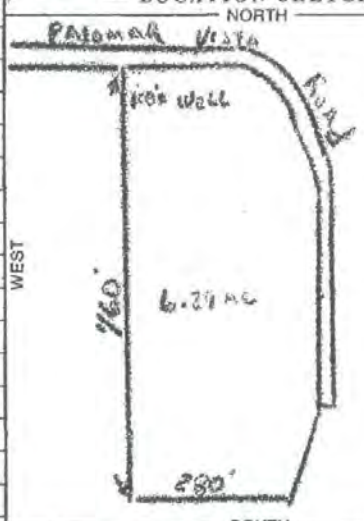
County San Diego

APN Book 134 Page 131 Parcel 03

Township 10S Range 1E Section 9

Latitude ___ DEG. ___ MIN. ___ SEC. NORTH Longitude ___ DEG. ___ MIN. ___ SEC.

LOCATION SKETCH



Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.
PLEASE BE ACCURATE & COMPLETE.

ACTIVITY

X NEW WELL

___ MODIFICATION/REP/

___ Deepen

___ Other (Sp

___ DESTROY (Desc Procedures and Under "GEOLOC

PLANNED U: (✓)

___ MONITORIN

WATER SUPPLY

X Dome

___ Public

___ Irrigat

___ Indust

___ "TEST WEL

___ CATHODIC TION

___ OTHER (Spe

DRILLING METHOD Rotary FLUID Gel & Air

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL 3 (Ft.) & DATE MEASURED 4-4-95

ESTIMATED YIELD* 50 (GPM) & TEST TYPE airlift

TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN 200 (Ft.)

** May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL/ GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	85	12	X				A129	6	.188	
0	200	6	X				F480	4.5	sch 40	
200	260	6		X			F480	4.5	Sch 40	.032

ANNULAR MATERIA

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER (TYPE/S
0	20	X			
20	85			Pea	Gravel

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and

NAME Fain Drilling & Pump Co Inc
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 12029 Old Castle Rd. CITY Valley Center, Ca STATE 92082 ZIP

Signed Joe P Fain
WELL DRILLER/AUTHORIZED REPRESENTATIVE

4/11/95 DATE SIGNED

326287 C-57 LICENSE

DWR 188 REV. 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

-A-21

COPY

ASSESSORS PARCEL NUMBER: 112 220 12

COUNTY OF SAN DIEGO
DEPARTMENT OF HEALTH SERVICES
1700 PACIFIC HIGHWAY, SAN DIEGO, CA 92101-2417

Intent No. 245163
Permit No. or Date W-61023

WATER WELL DRILLERS REPORT
(INSERT under ORIGINAL PAGE w/carbon of State Form)

State Well No.
Other Well No.

(1) OWNER: Name Joe E. Burton
Address P.O. Box 1522
City Valley Center, Ca. Zip 92082

(2) LOCATION OF WELL (See instructions):
County San Diego County Owner's Well Number
Well address if different from above Palomar Mountain
Township 9S Range 1E Section 33
Distance from cities, roads, railroads, fences, etc.

DEPARTMENT USE ONLY
Completed Well Construction:
Date 10-27-88
Date Inspected 12-5-88
Comments
Water Sample Taken? yes
Sanitarian's Approval: Jerome Tiberg

(3) TYPE OF WORK:
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item (12))

(4) PROPOSED USE:
Domestic ☐
Irrigation ☒
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other ☐

(5) Equipment:
Rotary ☒ Reverse ☐
Cable ☐ Air ☒
Other ☐ Bucket ☐

(6) Gravel Pack:
Yes ☐ No ☒ Size
Diameter of above
Packed from to ft.

(7) Casing Installed:
Steel ☒ Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall
0	20	8 5/8	.188
0	214	4" (PVC Liner)	cl. 160

(8) Perforations:
Type of perforation or size of screen

From ft.	To ft.	Slot Size
194	214	1/8"

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 20 ft.
Were strata sealed against pollution? Yes ☐ No ☒ Interval ft.
Method of sealing

(10) WATER LEVELS:
Depth of first water, if known 28' (seepage) ft.
Standing level after well completion 50' ft.

(11) WELL TESTS:
Was well test made? Yes ☐ No ☒ If yes, by whom?
Type of test Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test ft. At end of test ft.
Discharge gal/min after hours Water temperature
Chemical analysis made? Yes ☐ No ☒ If yes, by whom?
Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 214 ft. Depth of completed well 214 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	12'	Small rocks, boulders in loamy topsoil.
12	70'	Yellow-tan Decomposed Granite
70	81	Weathered Granite-- meas. 1 GPM @ 70'.
81	95	Salt & pepper Granite
	95	Fracture in above
95	108	Salt & pepper Granite
	108	Fracture in weathered Granite
108	114	Salt & pepper Granite
114	116	Fractured weathered Granite
116	122	Salt & pepper Granite
122	124	Fractures w/ iron stains and water Measures 2 GPM.
124	130	Salt & pepper Granite
130	131	Fracture-weathered Granite
131	134	Fractured weathered Granite
134	140	Salt & pepper Granite
140	141	Fractured weathered Granite w/ water
141	146	Salt & pepper Granite
146	153	Fractured weathered Granite
153	162	Salt & pepper Granite
	162	Fracture-small Clay streak-weathered Granite
162	183	Salt & pepper Granite
183	189	Fractures in weathered Granite w/ wate
189	214	Salt & pepper Granite
		Measures 12 Gallons per minute total
		Bottom hole bit gauge 6 1/2"

Work Started 10/25 19 88 Completed 10/27 19 88

WELL DRILLERS STATEMENT: I hereby declare under penalty of perjury that the information provided in this report is true. This water well was installed in compliance with San Diego County Code and State of California, Department of Water Resources, Bulletin No. 74.

SIGNED W.F. Loughlin (Well Driller)

NAME Acme Drilling Co. Inc. (Person, firm, or Corporation) (Type or Print)

ADDRESS 365 W. 2nd Ave.-Suite 206

CITY Escondido, Ca. ZIP 92025

LICENSE NO. 526886 DATE THIS REPORT 10/28/88

DHS:EHP-732 (83) CONFIDENTIAL – NOT FOR PUBLIC USE – WATER CODE SEC. 13752

ASSESSORS PARCEL NUMBER 134 130 46

W60708

FIRST CARBON COPY

COUNTY OF SAN DIEGO
DEPARTMENT OF HEALTH SERVICES
1700 PACIFIC HIGHWAY, SAN DIEGO, CA 92101

Notice of Intent No. 22711 W60708
Local Permit No. or Date

WATER WELL DRILLERS REPORT
(INSERT under ORIGINAL PAGE w/carbon of State Form)

State Well No.
Owner Well No.

(1) OWNER: Name Thomas Burton
Address c/o 500 N. Newport Blvd. #100
City Newport Beh., Ca. Zip 92663

(2) LOCATION OF WELL (See instructions):
County San Diego Owner's Well Number 2
Well address if different from above State Park Rd., Palomar Mtn.
Township 10S Range 1E Section 9
Distance from cities, roads, railroads, fences, etc. approx. 75' east of "E1" well location

DEPARTMENT USE ONLY
Completed Well Construction:
Date 8-3-87
Date Inspected 7-8-87
Comments None
Water Sample Taken? No
Sanitarian's Approval: Tom Lotta R.S.

(3) TYPE OF WORK:
New Well X ☐ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item (2))

(4) PROPOSED USE:
Domestic ☐
Irrigation ☐
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other community x

(5) Equipment:
Rotary X ☐ Reverse ☐
Cable ☐ Air X ☐
Other ☐ Bucket ☐

(6) Gravel Pack:
Yes X ☐ No ☐ Size 5/16
Diameter of above 10"
Packed from 50 to 410 ft.

(7) Casing Installed:
Steel X ☐ Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall
+1	410	6 5/8	.134

(8) Perforations:
Type of perforation or size of screen

From ft.	To ft.	Slot Size
300	405	5/32x2½

(9) WELL SEAL:
Was surface sanitary seal provided? Yes X ☐ No ☐ If yes, to depth 50 ft.
Were strata sealed against pollution? Yes ☐ No ☐ Interval ft.
Method of sealing cement

(10) WATER LEVELS:
Depth of first water, if known approx. 234 ft.
Standing level after well completion ft.

(11) WELL TESTS: X driller X
Was well test made? Yes ☐ No ☐ If yes, by whom?
Type of test Pump ☐ 1 Bailer ☐ Air lift ☐
Depth to water at start of test ft. At end of test ft.
Discharge gal/min after hours Water temperature
Chemical analysis made? Yes ☐ No ☐ If yes, by whom?
Was electric log made? Yes ☐ No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth 437 ft. Depth of completed well 410 ft.

from ft.	to ft.	Formation (Describe by color, character, size of material)
0	34	26' rock, then DG layers
34	59	47' damp DG, loose rock 54'
59	84	71-76 very loose red DG; br DG 79-84
84	109	91 rock, 98 red clay w/gra 103 harder, broken to 109
109	134	114' rock; sm/frac. 128'
134	154	146 frac. BW/ox; harder BW
154	184	165 BW/ox brok. to 184; DG and very loose
184	209	cont. loose to 194; rose qu then into loose BW granit
209	234	coarse sand, sticky grn cl
234	259	layers of coarse & fine s w/3 to 4 gpm
259	309	multi col sand to 304' th broken/ox rock flowing 1
309	334	broken rock to 318 w/sand
334	359	brok. rock/339 some clay; 350 semm firm flowing 27
359	384	broken rock
384	409	brok. multi colored/406' w/some clay flowing 33 g
4094	437	421' sm/frac.; 425 harder

Flow was measured at approx. by airlift method. When actual pumped this flow maybe increas or decreased subject to the f mation conditions.

Work started 6/23 19 87 Completed 6/30

WELL DRILLERS STATEMENT: I hereby declare under pena of perju[illegible] that the information provided in this rep is true. This water well was installed in compli with San Diego County Code and State of Califor Department of Water Resources, Bulletin No. 74.

SIGNED [signature] (Well Driller)
NAME Multi Water Systems (Person, firm, or corporation) (Typed or printed)
Address Rt. 1 Box 66
City Escondido, Calif. 92025
License 365283A, C57 Date of this report 6/30/87

DHS:EHP-732 (83) CONFIDENTIAL – NOT FOR PUBLIC USE – WATER CODE SEC. 13

...PERMIT APPLICATION

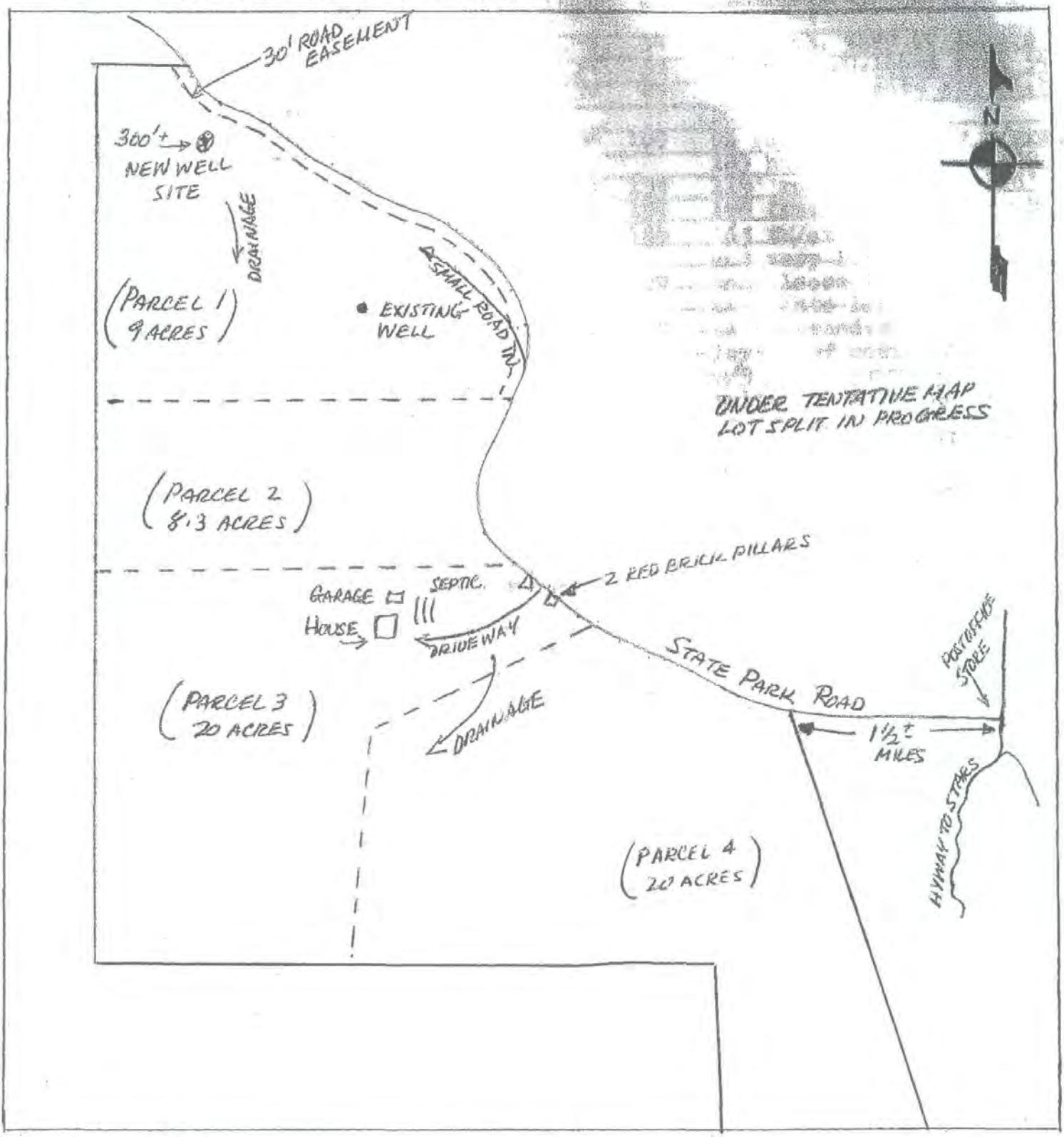
...DEPARTMENT OF HEALTH SERVICES

Control # W00705

Assessor's Parcel No. 134-130-46

LOCATION

INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.



STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 0903544

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE / LONGITUDE

APN/TRS/OTHER

Well No.

Work Began 7/2/04, Ended 7/5/04

Local Permit Agency San Diego

Permit No. LWEL 16002 Permit Date 5/26/04

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD Air Rotary FLUID

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	4	Top Soil
4	34	D.G.
34	50	Weathered B&W Granite
50	52	Slight Fracture B&W Granite
52	90	Weathered B&W Granite
90	92	Slight Fracture B&W Granite Water: 1 GPM
92	200	B&W Granite
200	265	Fractured B&W Granite Water: 100 GPM Total
265	280	B&W Granite

Inspected 10-13-06 (EK)
Well installed & operating

Completed Well Construction

Date 9-5-04

Date Inspected 10-27-06

Comments Well operating

Water Sample Taken? Not on file 12-7-06

Reviewed By E. Kleg

TOTAL DEPTH OF BORING 280 (Feet)

TOTAL DEPTH OF COMPLETED WELL 280 (Feet)

WELL OWNER

Name Bill Schmidt

Mailing Address 4910 Hawley Blvd.

City San Diego, CA 92116 (STATE / ZIP)

WELL LOCATION

Address 34320 Canfield Rd.

City Palomar Mtn., CA 92060

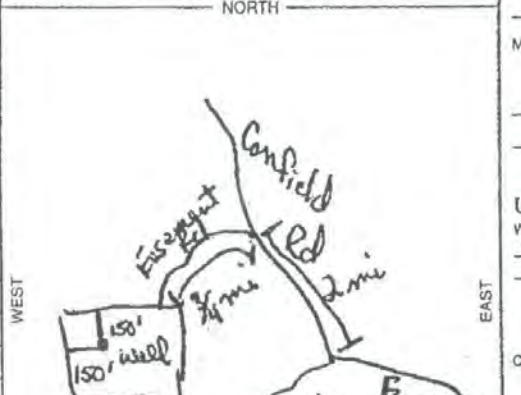
County San Diego

APN Book 134 Page 030 Parcel 06-00

Township 10S Range 1E Section 4

Lat ___ DEG. ___ MIN. ___ SEC. N Long ___ DEG. ___ MIN. ___ SEC

LOCATION SKETCH



Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Spec

___ DESTROY (Descr Procedures and M Under "GEOLOGI

USES (✓)

WATER SUPPLY

✓ Domestic ___ P

___ Irrigation ___ Ir

MONITORIN

TEST WEL

CATHODIC PROTECTIO

HEAT EXCHANG

DIRECT PUS

INJECTIO

VAPOR EXTRACTIO

SPARGIN

REMEDIATIO

OTHER (SPECIF

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 90 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL Unkn (Ft.) & DATE MEASURED

ESTIMATED YIELD * 100 (GPM) & TEST TYPE Air Lift

TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)

** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	42'	12	X				Steel	8	.188	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER P (TYPE/SI
0	36	✓			
36	42		✓		

LWEL 16002

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belie

NAME Stehly Brothers Drilling, Inc. (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 13268 McNally Rd. CITY Valley Center, STATE CA ZIP 92082

Signed Paul Stehly C-57 LICENSED WATER WELL CONTRACTOR

DATE SIGNED 8/6/04

C-57 LICENSE NU 7096

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

OSP

DUPLICATE
For Local Requirements WDR to MLLO 12/10/91 mr

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

Page 1 of 1
No. 479106

Owner's Well No. Spring Devel.#2
Date Work Began Nov. 15,1991 Ended Nov. 15,1991
Local Permit Agency San Diego County Health Dept.
Permit No. W30430 Permit Date Nov. 1, 1991

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	12	Top Soil
12	80	Yellow Clay

Completed Well Construction
Date ___
Date Inspected 12/17/91
Comments Evidence of bentonite seal. Owner advised of need for a drawing of apprn.
Water Sample Taken? No
Reviewed By C. Hummel

TOTAL DEPTH OF BORING 80 (Feet)
TOTAL DEPTH OF COMPLETED WELL ___ (Feet)

WELL OWNER

Name Carl H. Bergman
Mailing Address P.O. Box 99
City Palomar Mountain State CA ZIP 92060

WELL LOCATION

Address Canfield Road
City Palomar Mountain
County San Diego
APN Book 134 Page 030 Parcel 12
or Township 10S Range 1E Section 3
or Latitude ___ DEG. ___ MIN. ___ SEC. NORTH Longitude ___ DEG. ___ MIN. ___ SEC. WEST

LOCATION SKETCH

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (✓)

___ MONITORING
WATER SUPPLY
___ Domestic
___ Public
___ Irrigation
___ Industrial
___ "TEST WELL"
___ CATHODIC PROTECTION
X OTHER (Specify) Spring Dev.

DRILLING METHOD Air FLUID ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL ___ (Ft.) & DATE MEASURED ___
ESTIMATED YIELD* 1 (GPM) & TEST TYPE Air Lifted
TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
** May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL/GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	20	11			X		Steel	6⅝	.188	San.Seal
NO CASING										

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	20		X		

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME AGUANGA WATERWELL SERVICES (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
46450 Hwy 79 Aguanga, CA 92536
ADDRESS CITY STATE ZIP
Signed James R Haley WELL DRILLER/AUTHORIZED REPRESENTATIVE
11/22/91 DATE SIGNED
331998 C-57 LICENSE NUMBER

DWR 188 REV. 7-90
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

APPENDIX D.
Pumping Test Results,
PCCC Wells 3 and 5

Appendix D.
Well Tests: PCCC Wells 3 and 5

Attached Figures

D.1 Well 3. December 2008 Water Levels
D.2 Well 3. 72-hour Test Production Rate (14.75 gpm)
D.3 Well 3. 72-hour Drawdown (semi-log)
D.4 Well 3. 72-hour Recovery (semi-log)

D.5 Well 5. Pre-test Water Levels
D.6 Well 5. Pre-test Production Rates (Excel Data Table)
D.7 Well 5. 72-hour Test Production Rate (55 gpm)
D.8 Well 5. 72-hour Drawdown (semi-log)
D.9 Well 5. 72-hour Recovery (semi-log)
D.10 Well 5. 127-hour Drawdown, 36.6 gpm (semi-log)

Well Tests: PCCC Wells 3 and 5

Constant rate discharge tests were conducted for two production wells, Wells 3 and 5, located on the PCCC property as shown in **Figure 3** of this report. Both wells have been in use as water supply wells by the PCCC since their installation. Well 3 was installed 11/14/76; Well 5 was installed 7/19/91. Both are equipped with submersible electric pumps and plumbed into the PCCC's small water system.

72-hour constant rate discharge tests were required to be performed as described in the DPLU's letter dated May 15, 2007 specific to the PCCC's application for a Major Use Permit Modification (**Appendix A**). These tests were conducted in January 2009 for Well 3 and in August 2008 for Well 5. Both wells were monitored during routine operations prior to testing. Flow rates were calculated from totalizer data collected by PCCC staff.

Both wells are completed in highly fractured and weathered granitic bedrock dominated by regional lineaments that are roughly parallel to and potentially related to the Elsinore Fault Zone. Extensive weathering occurs throughout the area where the wells are located and saturated decomposed granite (DG) was reported to occur in both wells by the well driller. The well logs are included in **Appendix E** of this report.

A well test plan was submitted and approved by the DPLU prior to well testing. The testing for Well 3 differed slightly from the testing of Well 5 in that a step rate discharge test was not conducted. Instead a short-term (4-hour) test was conducted at an 18 gpm rate based on prior pumping history. Both wells have been actively used for years, so it is anticipated that a true static water level would not be observed prior to testing. Both wells are expected to be in late stage recovery even after a month or more of recovery (unpumped) conditions.

The overall testing results support a long-term discharge rate of approximately 15 gpm for Well 3 and approximately 35 gpm for well 5. Shorter-term discharge rate (i.e. for less than 3 to 5 days) are significantly higher.

Well 4 was not included in the test program because it produces poor quality, iron-rich water and is not part of the PCCC's water supply system.

The following presents the test results. All of the tests were interpreted using the Cooper-Jacob approximation to the Theis equation for constant rate groundwater flow to a pumping well. Please refer to the DPLU March 19, 2007 *Guidelines for Determining Significance and Report Format and Content Requirements: Groundwater Resources* for further explanation of the test analyses. It is noteworthy that the well responses could be reasonably approximated using conventional test interpretations methods given the site setting.

Well 3 Results

Well 3 was completed in 1976 to a depth of 300 feet and had a discharge rate of 50 gpm reported by Rex Anderson Drilling Company. It has a sanitary seal constructed to a depth of 50 feet and was initially completed without an inner casing. N inner casing was installed 7/2003 (as documented in **Appendix E**). The results of the 72-hour constant discharge test for Well 3 support a constant discharge rate of approximately 15 gpm without excessive long-term (5 year) drawdown.

Well 3 is equipped with a Global Water WL-16 water level transducer and vented cable (*http://www.globalw.com/downloads/WL16/WL16.pdf*). The WL-16 was semi-permanently installed in the well because a sounding tube cannot be installed in the relatively small diameter (4.57-inch ID PVC inner casing) well. It was selected for use primarily because it has a surface-accessible battery to allow long-term operation since pump will need to be removed to access the downhole transducer. The shortcoming of the WL-16 water level meter is that water levels are measured with relatively low accuracy- within a foot or so, and the pumping test data (for example during the late time recovery portion of the tests) are 'noisy'.

Flow measurements were conducted using an electronic totalizer and instantaneous flow meter plumbed into the discharge line. A large robust valve was used to control the pump discharge. The 72-hour tests required manual adjustment of the flow rates to ensure that a constant discharge rate was maintained during the tests. PCCC staff provided hourly measurements and flow checks under the supervision of a DPLU-approved hydrogeologist (Jay Jones).

Data collection began 8/12/08 during a period of time when the operating water level in the well was below the transducer. The well was shut down most of September, operated again during the first 3 weeks of October, and then shut down prior to testing.

Figure D.1 depicts the water level history during the pre-test period. A four hour test was run in early December, then the well operated until mid-December. The battery capacity dropped due to low temperature and no more data were able to be collected until the 72-hour test was set up in January.

Figure D.2 shows the production rate during the 72-hour test. There was a short duration shut-down of the pump. Since short-term pumping rates are not known, reinterpretation for the test using superposition methods could not be done.

Figure D.3 shows the drawdown data for the 72-hour test and the linear regression done for the late-time data. The projected drawdown after 5 years of pumping is 125 feet versus a saturated section in the well of over 200 feet.

Figure D.4 shows the recovery data for the 72-hour test and the linear regression done for the analysis of the late-time data.

Well 5 Results

Well 5 was completed in 1991 to a depth of 205 feet and had a discharge rate in excess of 200 gpm as reported by Rex Anderson Drilling Company. It has a sanitary seal constructed to a depth of 55 feet and is completed without an inner casing. It is an artesian well under static conditions.

Well 5 has a permanent sounding tube installed. Water levels were manually conducted using a Solinst water level meter and were also recorded using an unvented Solinst Levelogger® Model 3001 pressure transducer (http://www.solinst.com/Prod/3001/3001.html). Barometric measurements were also recorded using a Solinst BaroLogger®.

Flow measurements were conducted using an electronic totalizer and instantaneous flow meter plumbed into the discharge line. The 72-hour test was conducted after disconnecting the well from the PCCC water supply system. The well pump provides approximately 400 feet of lift to supply a storage tank located at an elevation above most of the PCCC facility. A large robust valve was used to control the pump discharge and a 200-ft fire hose was used to discharge the water during the test. Since the pump was directly discharging water, it was able to be operated at a higher pumping rate, approximately 20 to 30 gpm higher than it is normally operated.

The 72-hour tests required manual adjustment of the flow rates to ensure that a constant discharge rate was maintained during the tests. PCCC staff provided hourly measurements and flow checks under the supervision of a DPLU-approved hydrogeologist (Jay Jones).

Water level data collection began August 1, 2008. The well was intermittently used during the pre-test period. Of particular note is the initial period up to August 14 where a pumping rate of approximately 36.6 gpm was maintained for an approximately 5-day period. The long-term projection of the results of the 55 gpm 72-hr test show the excessive drawdown could theoretically occur in the well if it were to be continuously pumped for a 5 years at 55 gpm. Additional data interpretation for Well 5 was conducted using the drawdown results obtained during routine pumping at an estimated rate of 36.5 gpm pumping period conducted over 5.3 days (127 hours) when Well 5 was in constant use. These data support a long-term discharge rate of 35 gpm.

Figure D.5 is a record water levels observed before the 72-hour test. The following can be observed:

A. Ongoing production at ~37 gpm that ended after approximately 127 hours.
B. Short-term production at ~38 gpm for 56 min.
C. 74 hour recovery period prior to step test
D. Four step pumping test (~6 hours)
E. 90 hour recovery period
F. 72 hour constant discharge test (55.0 gpm). Note the distinct difference (increase) in rate of drawdown over time versus 37 gpm production rate.
G. 189 hour recovery period
H. Note water level recovery above that observed prior to step test and 72 hr tests. It is likely that artesian flow would occur with additional time.
I. Resumption of water production

The interval flow rates prior to testing were calculated from cumulative flowmeter data and observed pumping cycles/water level changes as indicated in Figure D.6. As noted, the 55 gpm rate does not appear to be sustainable in contrast to the 37 gpm rate currently used for ongoing water production from well 5 (an annual rate of approximately 60 Acft/yr if pumped continuously).

Figure D.6 is a record of cumulative production rates observed before the 72-hour test.

Figure D.7 shows the production rate during the 72-hour test.

Figure D.8 shows the drawdown data for the 72-hour test and the linear regression done for the late-time data. The projected drawdown after 5 years of pumping is 217 feet versus a total well of 205 feet, so the 55 gpm rate is theoretically unsustainable

Figure D.9 shows the recovery data for the 72-hour test and the linear regression done for the late-time data.

Figure D.10 shows the drawdown data for the 127-hour pretest and the linear regression done for the late-time data. The projected drawdown after 5 years of pumping is 95 feet versus a total well of 205 feet, so the 36.6 gpm rate is theoretically sustainable. The start time for the drawdown test was back-calculated using the observed interval pumping rate (in Figure D.6). The early time pumping rates are likely to be similar to the later time rates since the pump is supplying water to a storage tank approximately 400 feet above the wellhead. Calculated rates for subsequent pumping cycles were 33.9, 38.6, and 37.9 gpm, so the back-calculated rate is judged to be reasonable. A long-term pumping rate of 35 gpm has been assigned to this well.

Test Summary

The test results are summarized in the following table. Please note that the step discharge test data for well 5 were not evaluated since the discharge rates were higher than the long-term sustainable rate of 35 gpm.

Well Test Summary

	Well3		Well 5		
	Drawdown	Recovery	Drawdown	Recovery	Drawdown
Test Duration	72 hrs		72 hrs		127 hrs
Initial Water Depth, ft btc	71.9		2.96		~1 ft (est)
Initial Water Column, in ft	228.1		202.04		204
Max Drawdown, in ft.	53.8		71.03		53.16
Water Depth at Max DD, in ft	125.7		73.99		54
Well Total Depth, ft	300		205		205
Q, gpm	14.75	14.75	55.0	55.0	36.6 (est)
ln slope (see graphs)	11.094	37.60	22.72	22.85	7.12
Estimated Transmissivity, ft2/day	46.91	13.84	85.41	84.92	181.36

Figure D.1
Well 3 December 2008 Water Levels

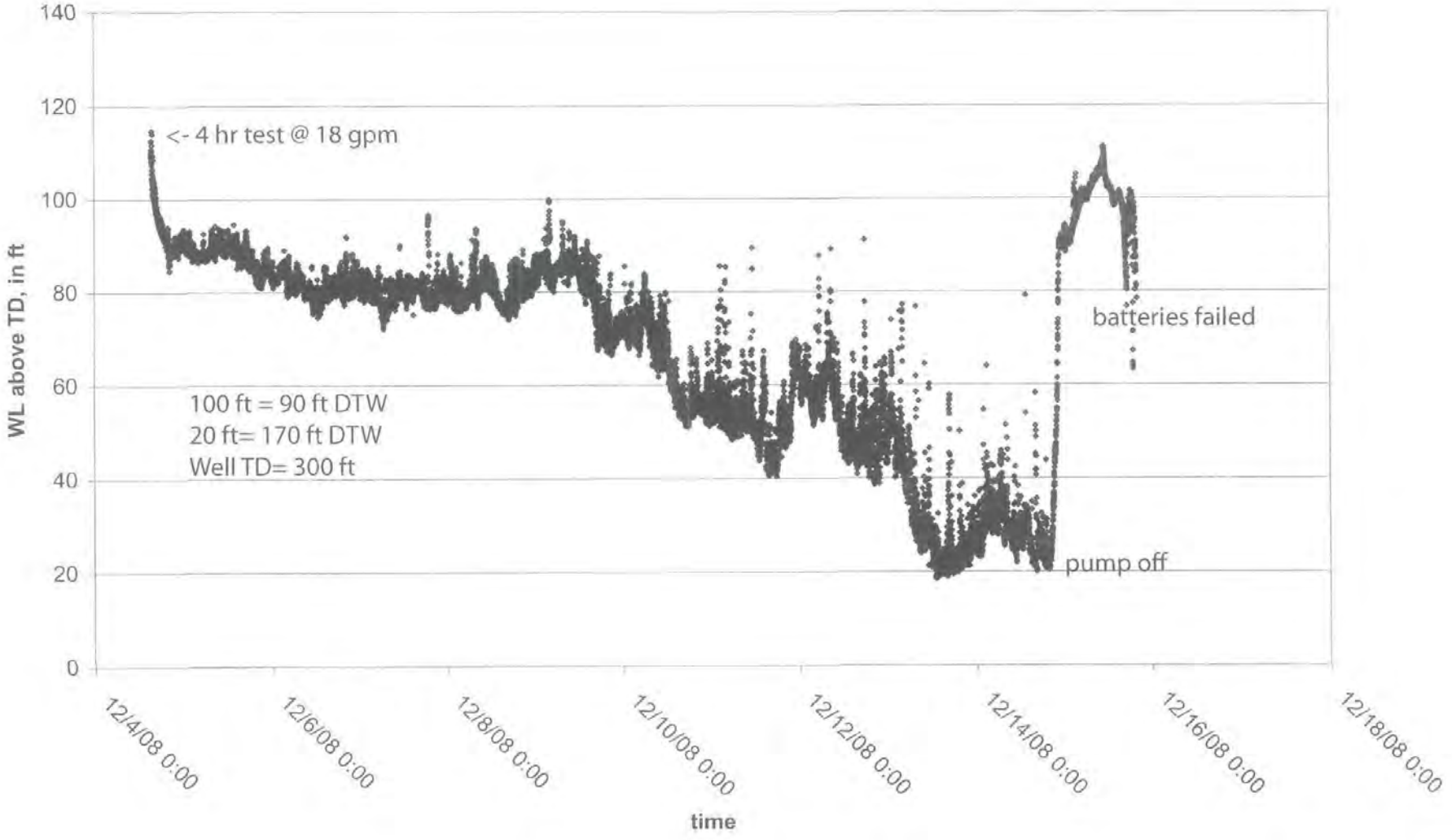


Figure D 2
Well 3, 72-hr test pumping rate

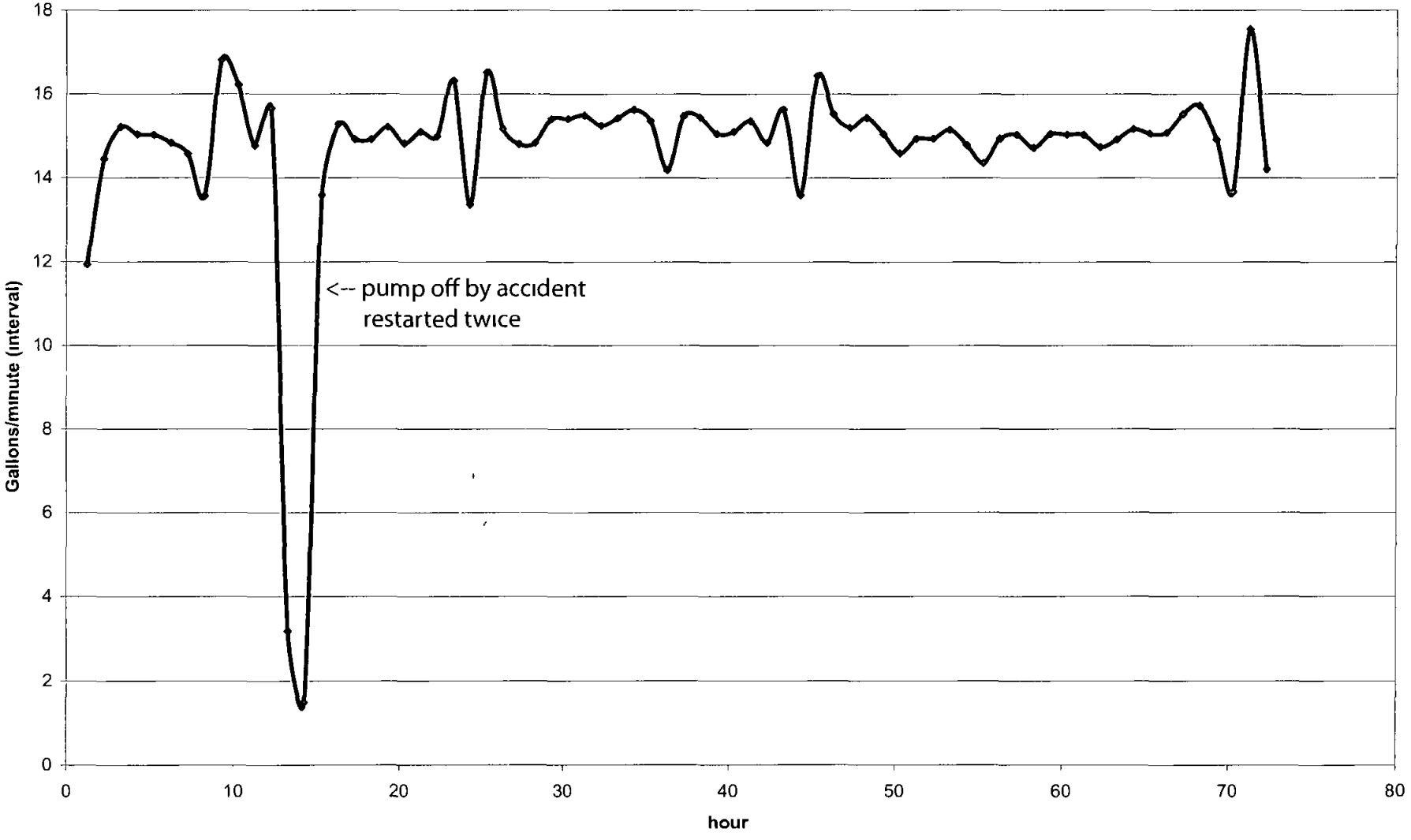


Figure D.3
Well 3: 72-hr Drawdown (14.75 gpm)

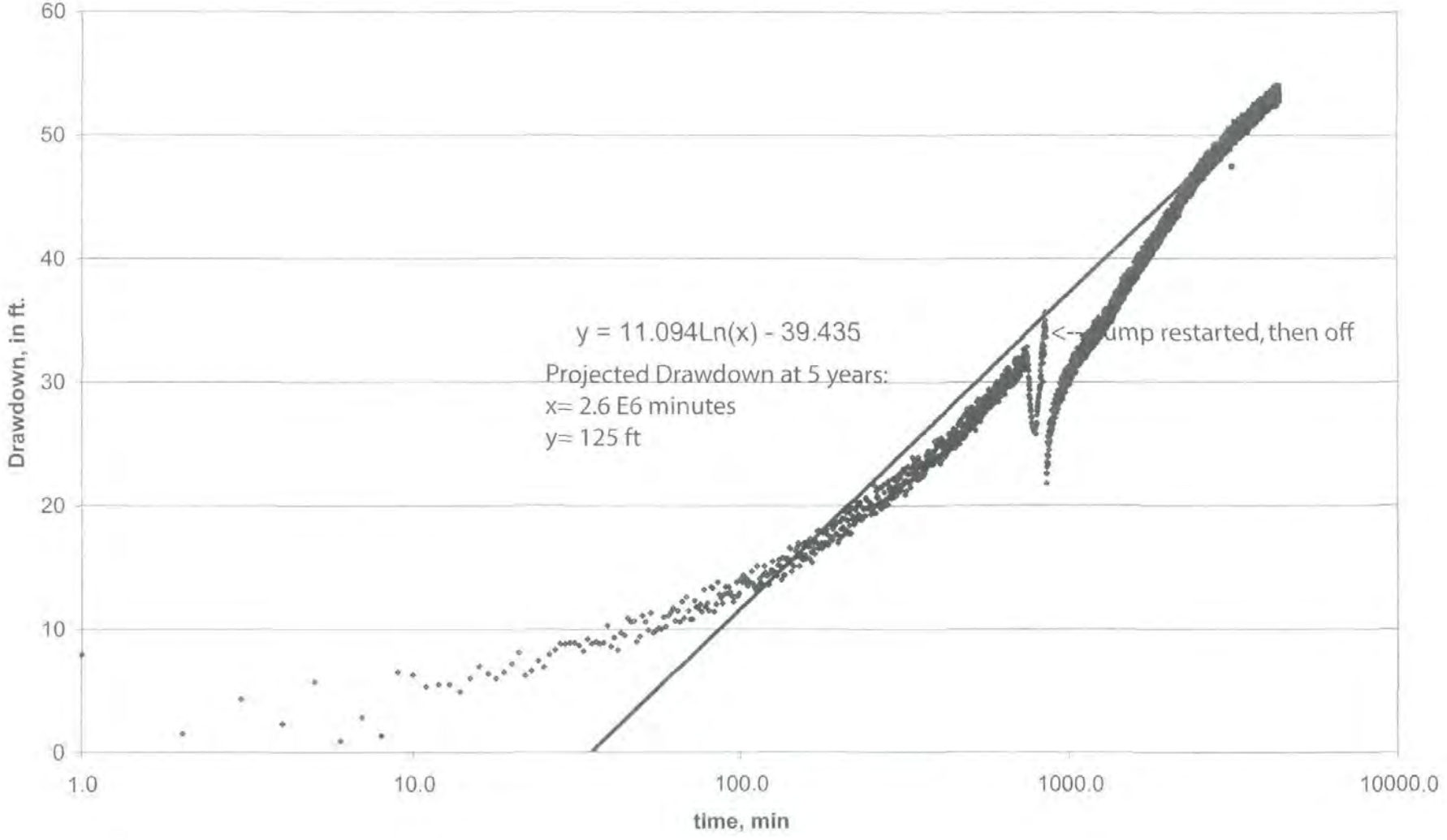


Figure D 4
Well 3 72-hr Test Recovery

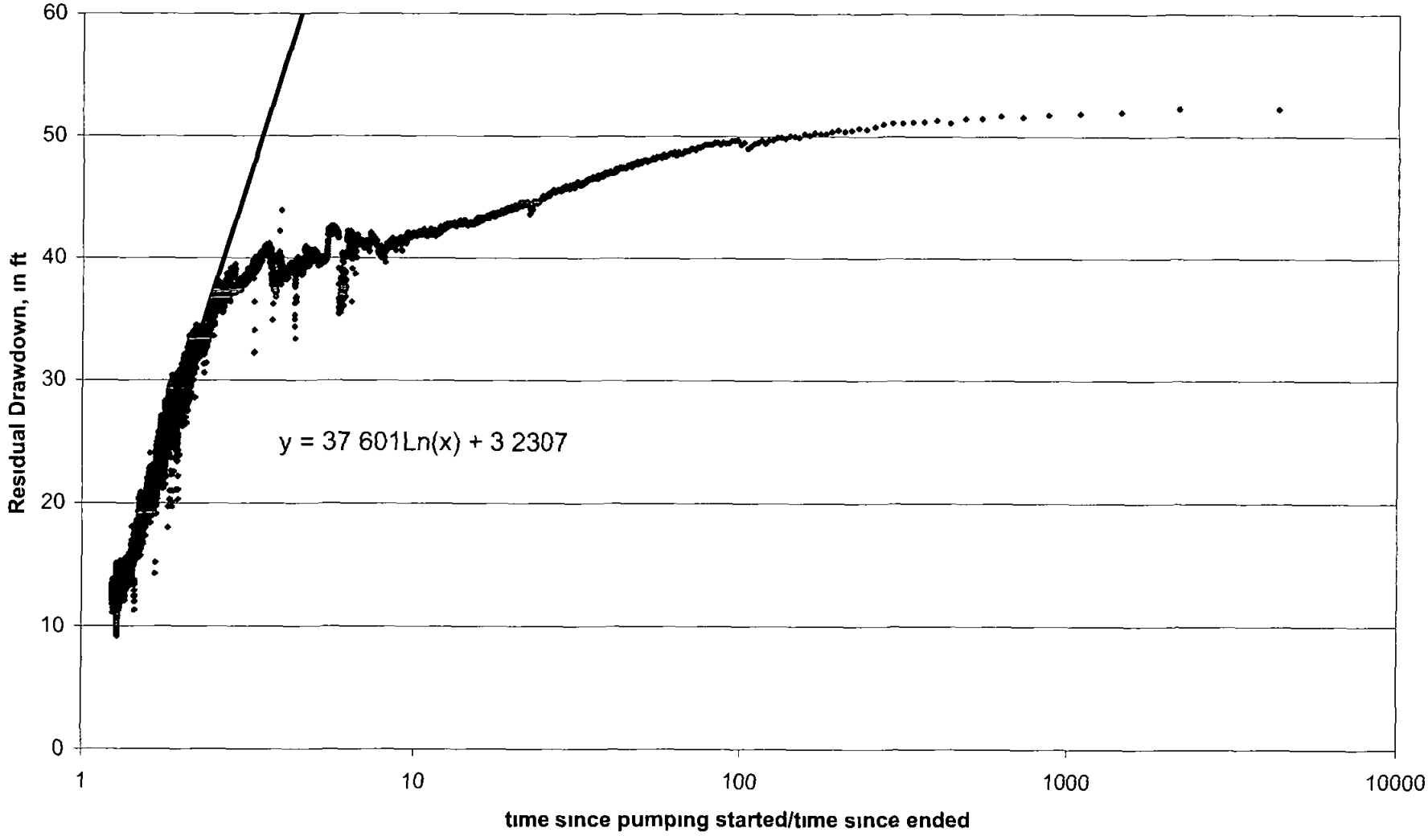


Figure D.5
Well 5 Pre-test and 72-hr Test Water Levels

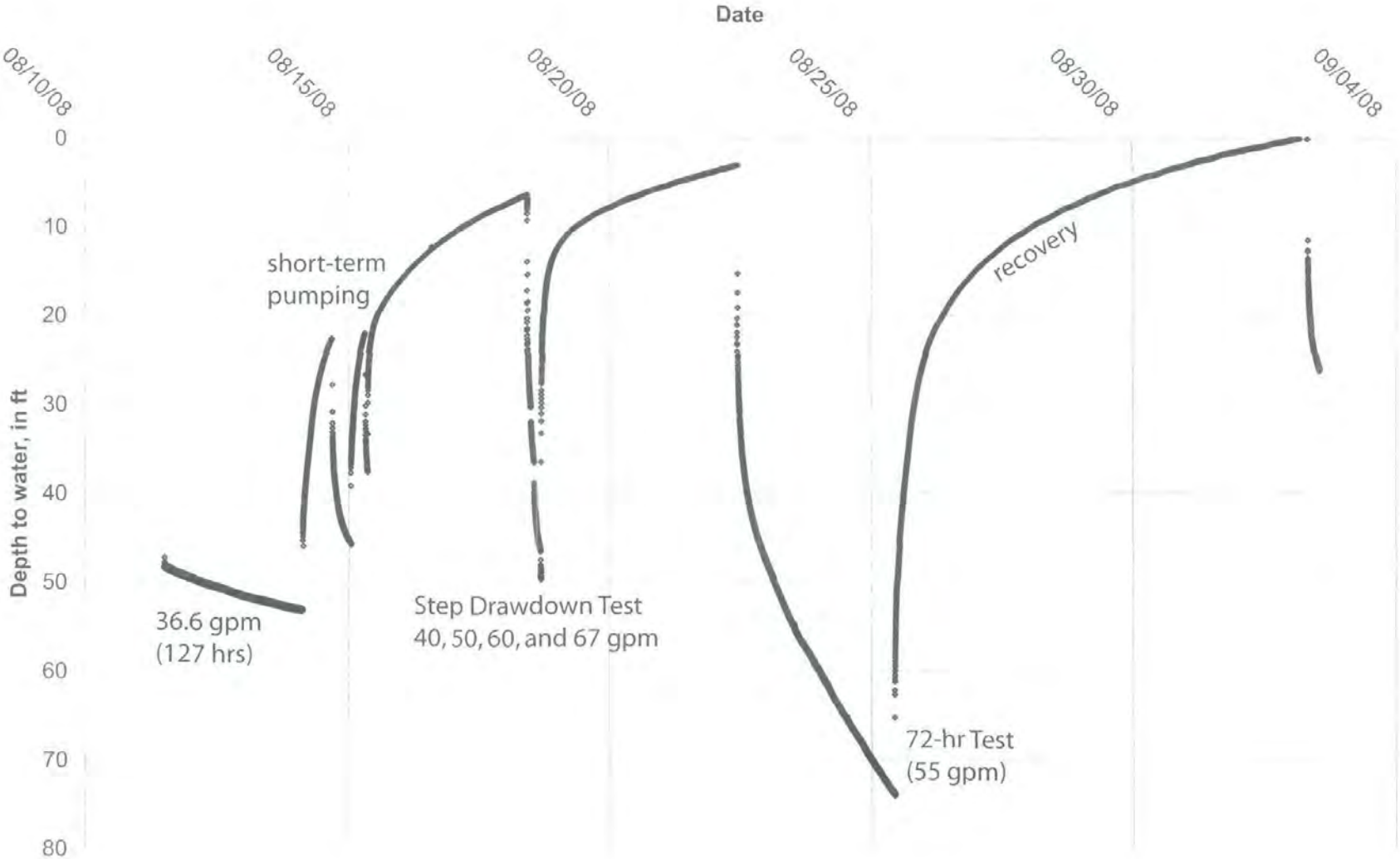


Figure D.6
Well 5 Production Data and Pre-test Pumping Rates
(step test: 8/18; 72-hr test: 8/22)

	date	time		cum gals	int. gallons	minutes	int. gpm	Pump On?
PCCC Records								(y= yes)
x	8/1/2008			39,528,850				off
x	8/11/2008	13:17		39,673,800	144,950	15,197	9.5	y
x	8/12/2008	8:37		39,716,465	42,665	1,160	36.8	y
x	8/13/2008	9:05		39,770,225	53,760	1,468	36.6	y
x	8/13/2008	17:00		39,786,315	16,090	475	33.9	y
	8/14/2008	2:49		39,809,050	22,735	589	38.6	off shutoff based on transducer info
x	8/14/2008	9:02		39,809,050	0	373	0.0	no- was turned off at 2:49 am
	8/14/2008	16:25		39,809,050			0.0	on
x	8/14/2008	17:21		39,811,170	2,120	56	37.9	y
	8/15/2008	1:03						off
	8/15/2008	7:45						on
x	8/15/2008	8:45		39,830,660	19,490			y
	8/15/2008	8:52						off

	date	time		cum gals	int. gallons	minutes	gpm	
Constant rate summary: 36.6 gpm								
stimated	8/8/2008	19:20		39,528,850				backcalculated based on 36.6 gpm
	8/11/2008	13:17		39,673,800	144,950	3957.00	36.63	already on for 2+ days
	8/14/2008	2:49		39,809,050	135,250	3692.00	36.63	shut off during the night FM read in AM

Test Duration: 36.6 gpm

start	8/8/2008	19:20	8/8/08 19:20	
stop			8/14/08 2:49	
duration			5.312	days
			127.5	hours

Figure D.7
Well 5 72-hr Test Pumping Rate (55.02 gpm)

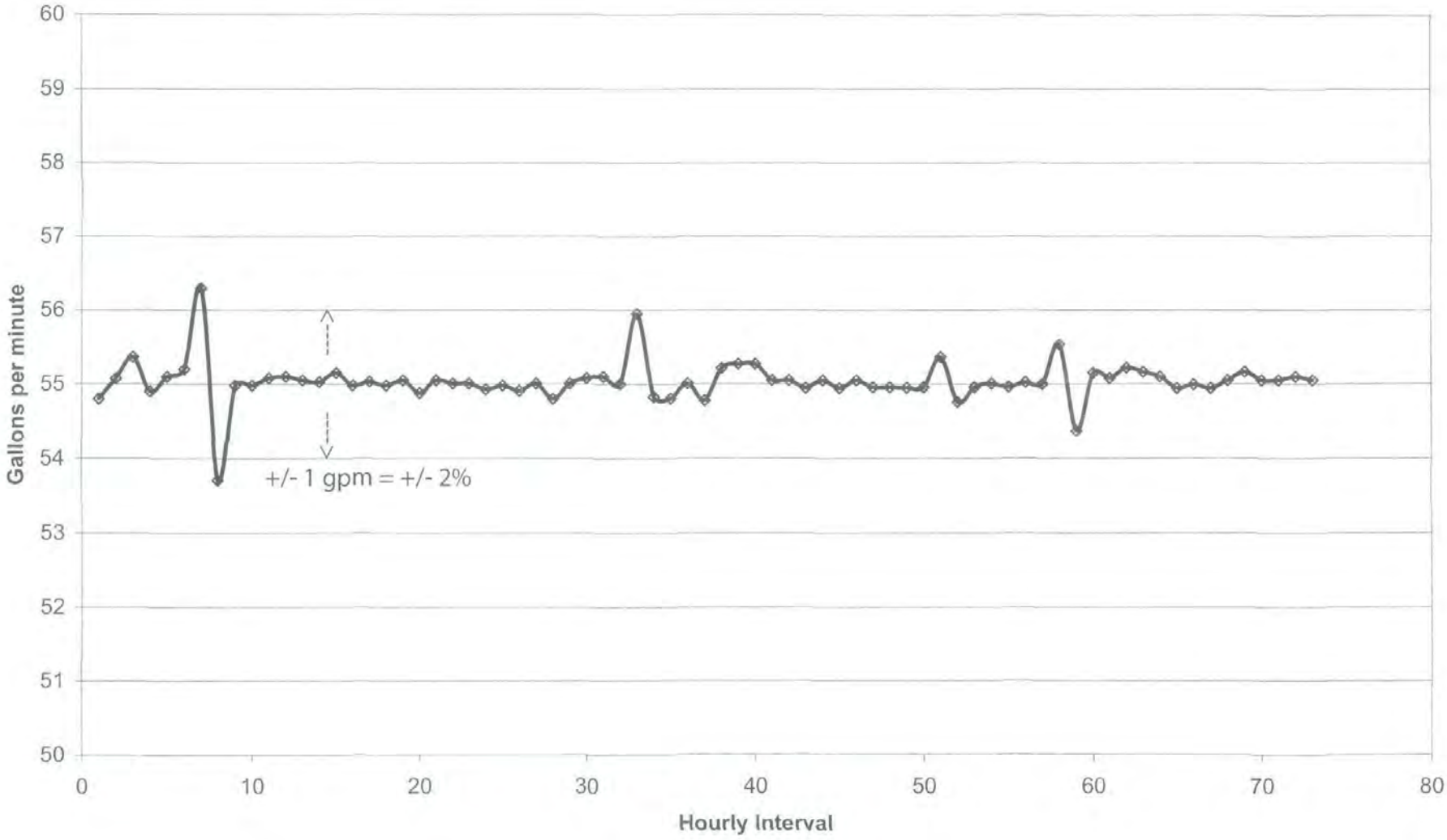


Figure D 8
Well 5 72-hr Drawdown (55 gpm)

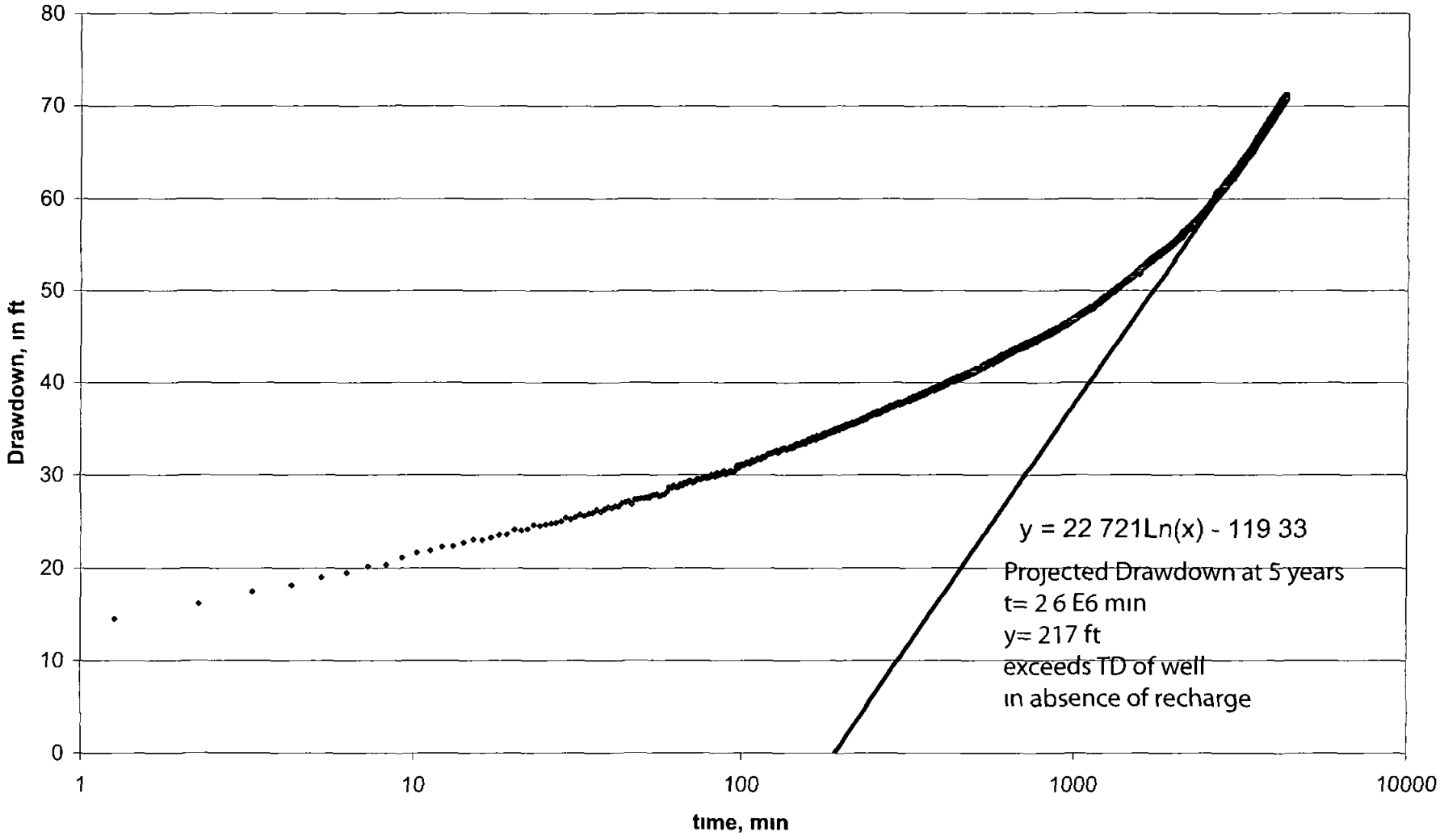


Figure D.9
Well 5 Recovery (w/ artesian trend)

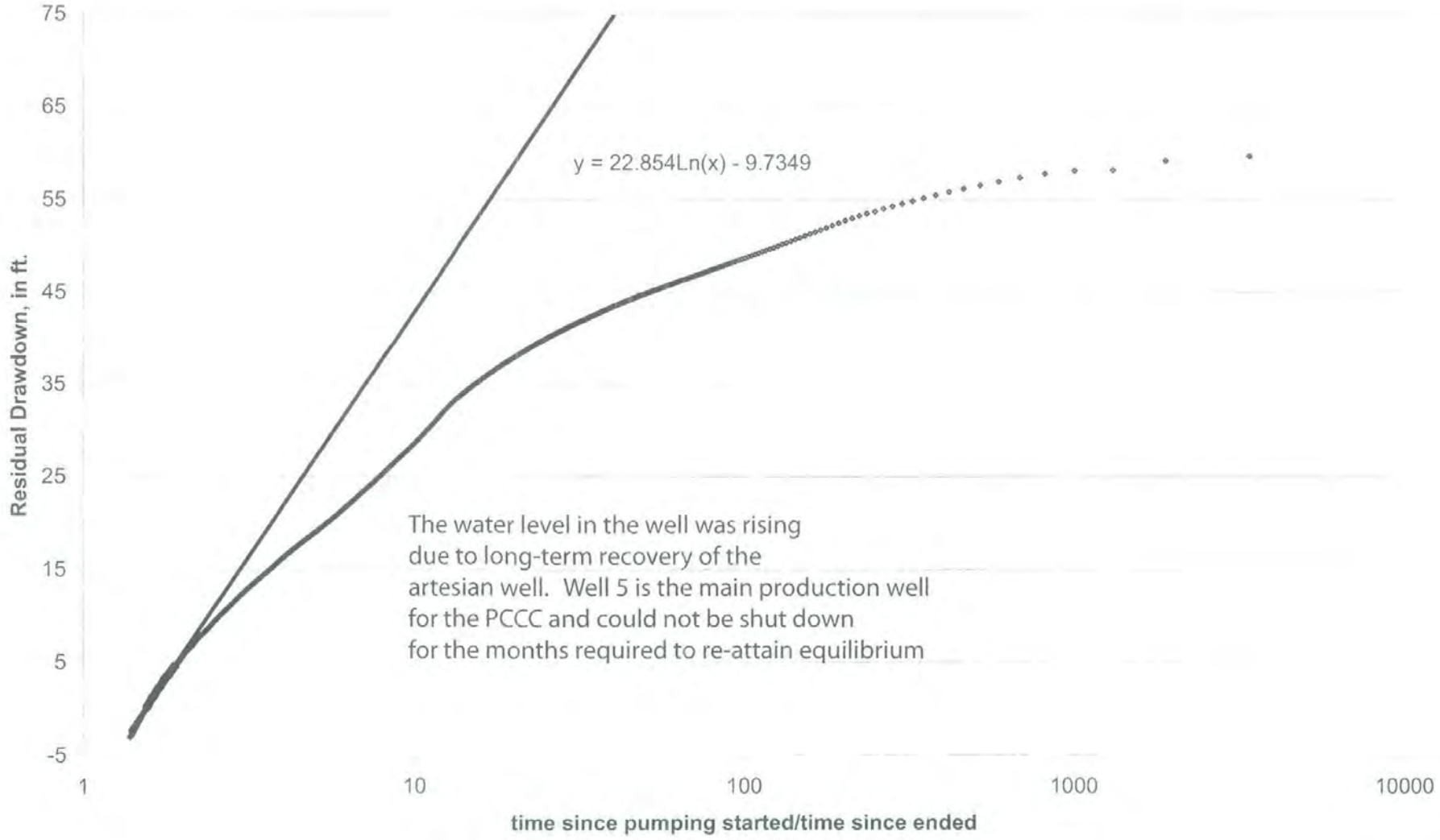
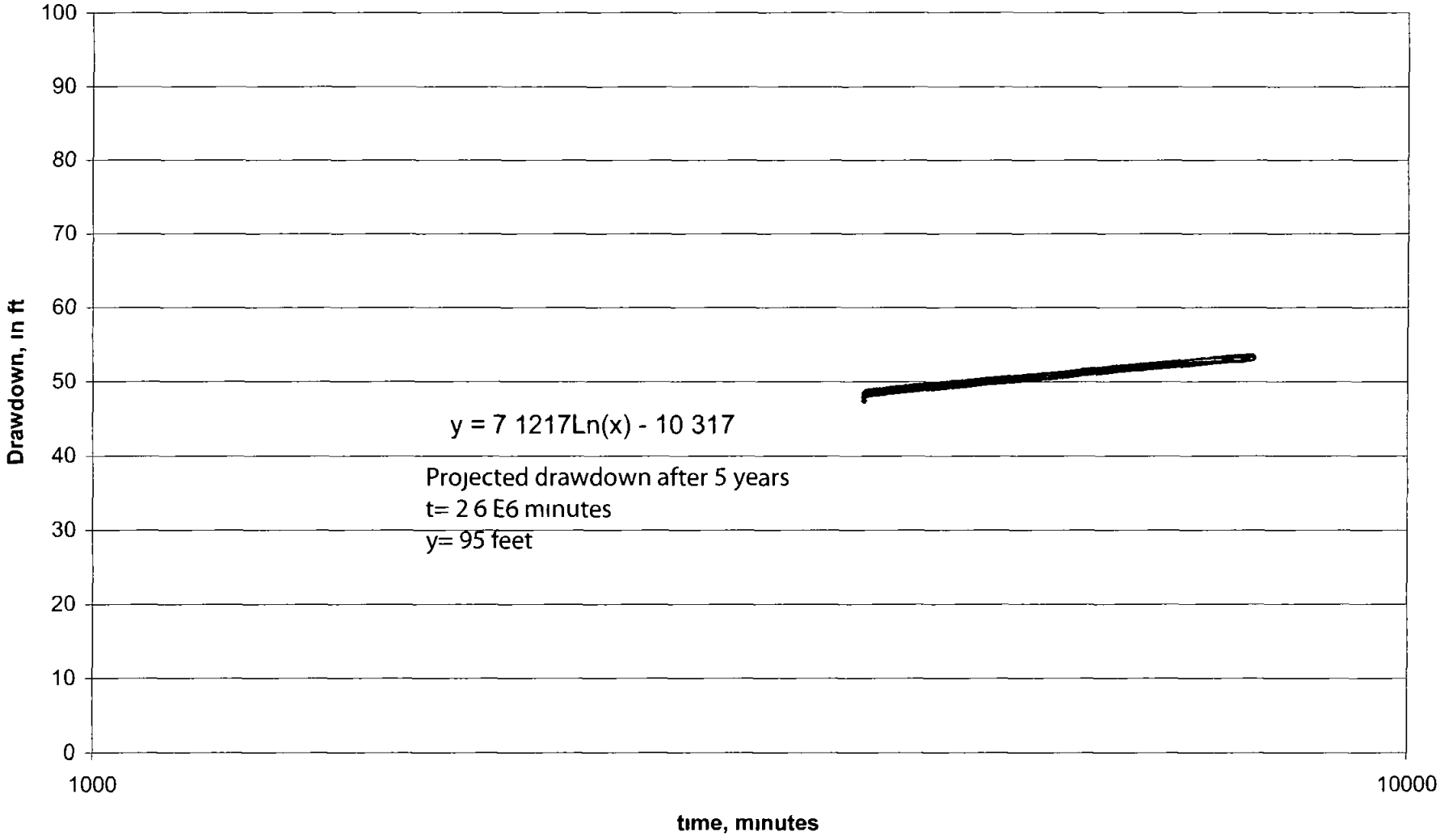


Figure D 10
Well 5 127-hr Late-time Drawdown (36 6 gpm)



APPENDIX E.
Soil Moisture Water Balance Spreadsheets

RECHARGE CALCULATIONS: Soil Moisture Balance

ver. 25Mar09

PCCC, Palomar Mountain, CA

Rainfall Statistics (inches/yr)		
maximum	71.9	(1992 to 1993)
minimum	9.2	(2001-2002)
average	29.6	(1971-2005)
st dev	17	
30 year avg (1971 to 2001)	29.65	
DPLU Map Rainfall for Site	34.50	(33 to 36)
Difference (increase)	1.16	
Adjustment Factor	1.16 (rf)	

Soil Parameters	
4.50	Soil Moisture Capacity, smcap
0.3	Runoff Coefficient, roff

Indicates Input Variables

EvapoTranspiration

	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	total	
CIMIS 9	7.44	6.82	5.70	4.03	2.70	1.86	2.17	2.80	4.03	5.10	5.89	6.60	55.14	
Irrigation	7.44	6.82	5.70	4.03	2.70	0.00	0.00	0.00	4.03	5.10	5.89	6.60	48.31	(for 9 months)

Monthly Rainfall Data: 1971- 2005

YEAR		July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Annual Roff, Rch	by pct.	
1971		0.00	0.30	0.00	1.94	0.38	8.91	0.00	0.67	0.00	1.03	0.70	1.70		18.13	adj RF
Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.12	1%	runoff
SM param		-7.44	-6.47	-5.70	-1.78	-2.26	8.48	2.33	0.31	-3.72	-3.91	-5.08	-4.63			
Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	4.50	2.33	0.31	0.00	0.00	0.00	0.00		77%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	3.98	0.00	0.00	0.00	0.00	0.00	0.00	3.98	22%	recharge
1972		0.02	0.00	0.00	1.86	6.11	6.39	5.47	7.80	8.60	0.00	0.00	0.00		42.05	adj RF
Runoff		0.00	0.00	0.00	0.00	0.00	2.17	1.90	2.71	2.99	0.00	0.00	0.00	9.78	23%	runoff
SM param		-7.42	-6.82	-5.70	-1.87	4.39	9.94	8.68	10.75	10.45	-0.60	-5.89	-6.60			
Soil Mo.	0.00	0.00	0.00	0.00	0.00	4.39	4.50	4.50	4.50	4.50	0.00	0.00	0.00		48%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	3.27	2.27	3.53	2.95	0.00	0.00	0.00	12.03	29%	recharge
1973		0.00	0.19	0.00	0.00	4.66	0.50	4.28	0.00	5.05	1.48	0.00	0.00		18.75	
Runoff		0.00	0.00	0.00	0.00	0.00	0.10	0.47	0.00	0.55	0.37	0.00	0.00	1.50	8%	runoff
SM param		-7.44	-6.60	-5.70	-4.03	2.71	1.43	4.22	1.42	3.25	-0.13	-5.89	-6.60			
Soil Mo.	0.00	0.00	0.00	0.00	0.00	2.71	1.43	4.22	1.42	3.25	0.00	0.00	0.00		92%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0%	recharge
1974		1.49	0.13	0.74	4.04	0.12	4.60	0.25	2.48	9.93	4.64	0.25	0.00		33.26	
Runoff		0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.31	1.28	1.61	0.09	0.00	3.37	10%	runoff
SM param		-5.71	-6.67	-4.84	0.66	-1.90	3.48	1.60	1.67	9.16	4.78	-1.10	-6.60			
Soil Mo.	0.00	0.00	0.00	0.00	0.66	0.00	3.48	1.60	1.67	4.50	4.50	0.00	0.00		80%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.38	0.00	0.00	0.00	3.38	10%	recharge
1975		0.00	0.00	0.57	0.54	2.65	0.69	0.00	11.11	4.49	2.93	0.50	0.00		27.24	
Runoff		0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	1.56	1.02	0.11	0.00	2.71	10%	runoff
SM param		-7.44	-6.82	-5.04	-3.40	0.37	-0.69	-2.17	10.09	5.68	2.80	-2.51	-6.60			
Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	4.50	4.50	2.80	0.00	0.00		70%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.59	0.00	0.00	0.00	0.00	5.59	21%	recharge
1976		1.20	0.00	6.42	0.14	1.15	1.96	7.31	1.23	4.24	0.65	4.61	0.04		33.58	
Runoff		0.00	0.00	0.00	0.02	0.00	0.00	0.23	0.43	1.03	0.20	0.00	0.00	1.91	6%	runoff
SM param		-6.05	-6.82	1.75	-2.12	-1.37	0.41	6.72	3.13	4.02	-0.33	-0.54	-6.55			
Soil Mo.	0.00	0.00	0.00	1.75	0.00	0.00	0.41	4.50	3.13	4.02	0.00	0.00	0.00		88%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	0.00	1.99	0.00	0.00	0.00	0.00	0.00	1.99	6%	recharge
1977		0.16	4.24	0.00	0.00	0.00	7.73	19.18	13.11	15.36	4.22	0.28	0.00		74.56	
Runoff		0.00	0.00	0.00	0.00	0.00	0.00	6.67	4.56	5.35	1.47	0.09	0.00	18.14	24%	runoff
SM param		-7.25	-1.90	-5.70	-4.03	-2.70	7.11	24.58	16.91	18.29	4.30	-1.27	-6.60			
Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	4.50	4.50	4.50	4.50	4.30	0.00	0.00		32%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	2.61	13.40	7.85	8.44	0.00	0.00	0.00	32.30	43%	recharge
1978		0.00	0.00	1.84	0.83	3.97	6.15	8.37	7.13	13.04	0.04	0.00	0.06		48.06	
Runoff		0.00	0.00	0.00	0.00	0.00	0.91	2.91	2.48	4.54	0.01	0.00	0.00	10.85	23%	runoff
SM param		-7.44	-6.82	-3.57	-3.07	1.91	7.18	12.04	9.97	15.60	-0.55	-5.89	-6.53			
Soil Mo.	0.00	0.00	0.00	0.00	0.00	1.91	4.50	4.50	4.50	4.50	0.00	0.00	0.00		44%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	1.77	4.63	2.99	6.56	0.00	0.00	0.00	15.95	33%	recharge
1979		1.10	0.74	0.00	3.47	0.46	1.03	18.63	19.89	6.88	1.62	0.93	0.00		63.51	
Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.92	2.39	0.56	0.09	0.00	9.97	16%	runoff
SM param		-6.16	-5.96	-5.70	0.00	-2.17	-0.67	19.44	24.77	8.45	1.28	-3.53	-6.60			
Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50	4.50	4.50	1.28	0.00	0.00		37%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	0.00	14.94	13.35	1.56	0.00	0.00	0.00	29.85	47%	recharge
1980		0.20	0.00	0.00	0.00	0.00	1.85	1.60	3.82	3.27	1.50	0.41	0.00		14.67	
Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.41	0.16	0.00	0.00	0.61	4%	runoff
SM param		-7.21	-6.82	-5.70	-4.03	-2.70	0.29	-0.03	1.63	1.39	-1.97	-5.41	-6.60			
Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	1.63	1.39	0.00	0.00	0.00		96%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0%	recharge
1981		0.05	0.00	0.00	0.70	3.70	1.50	2.58	1.52	3.89	0.52	0.00	0.00		16.77	
Runoff		0.00	0.00	0.00	0.00	0.00	0.18	0.29	0.27	0.38	0.07	0.00	0.00	1.20	7%	runoff
SM param		-7.38	-6.82	-5.70	-3.22	1.59	1.47	2.29	1.26	1.74	-2.76	-5.89	-6.60			
Soil Mo.	0.00	0.00	0.00	0.00	0.00	1.59	1.47	2.29	1.26	1.74	0.00	0.00	0.00		93%	ET bal
Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0%	recharge
1982		0.45	0.64	1.31	0.00	5.65	3.13	4.77	6.13	13.76	6.10	0.00	0.00		48.65	
Runoff		0.00	0.00	0.00	0.00	0.00	0.93	1.66	2.13	4.79	2.12	0.00	0.00	11.64	24%	runoff

	SM param		-6.92	-6.08	-4.18	-4.03	3.85	5.62	7.86	8.81	16.43	6.48	-1.39	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	3.85	4.50	4.50	4.50	4.50	4.50	0.00	0.00		53% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.19	1.70	2.18	7.14	0.00	0.00	0.00	**11.22**	23% recharge
1983			0.00	4.93	0.45	1.60	4.84	6.56	0.20	0.15	0.06	1.10	0.00	0.00		**23.07**
	Runoff		0.00	0.00	0.00	0.00	0.00	1.48	0.07	0.03	0.00	0.00	0.00	0.00	**1.58**	7% runoff
	SM param		-7.44	-1.10	-5.18	-2.17	2.91	8.66	2.56	-0.06	-3.96	-3.82	-5.89	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	2.91	4.50	2.56	0.00	0.00	0.00	0.00	0.00		82% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	2.69	0.00	0.00	0.00	0.00	0.00	0.00	**2.69**	12% recharge
1984			3.05	2.27	0.55	0.60	5.58	7.62	3.00	2.25	2.10	0.50	0.00	0.00		**31.92**
	Runoff		0.00	0.00	0.00	0.00	0.00	2.22	1.04	0.78	0.70	0.11	0.00	0.00	**4.86**	15% runoff
	SM param		-3.90	-4.19	-5.06	-3.33	3.77	10.75	5.81	4.31	2.72	-1.80	-5.89	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	3.77	4.50	4.50	4.31	2.72	0.00	0.00	0.00		71% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	4.03	0.27	0.00	0.00	0.00	0.00	0.00	**4.29**	13% recharge
1985			1.85	0.00	0.60	0.62	7.22	1.00	2.25	0.00	4.03	0.50	0.00	0.00		**20.96**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.35	0.66	0.00	0.45	0.08	0.00	0.00	**1.54**	7% runoff
	SM param		-5.29	-6.82	-5.00	-3.31	5.68	3.80	4.24	1.44	2.08	-2.44	-5.89	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	4.50	3.80	4.24	1.44	2.08	0.00	0.00	0.00		87% ET bal
	Recharge		0.00	0.00	0.00	0.00	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.18**	6% recharge
1986			0.38	0.00	2.26	0.85	1.85	3.45	4.35	3.67	1.90	0.45	0.68	0.00		**23.01**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.72	1.28	0.66	0.09	0.00	0.00	**2.75**	12% runoff
	SM param		-7.00	-6.82	-3.08	-3.04	-0.55	2.14	5.02	5.96	2.67	-1.90	-5.10	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	2.14	4.50	4.50	2.67	0.00	0.00	0.00		87% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	**0.18**	1% recharge
1987			0.00	0.00	0.24	2.81	3.10	3.19	3.40	1.39	0.70	3.78	0.48	0.00		**22.14**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.22	0.72	0.48	0.18	0.03	0.00	0.00	**1.63**	7% runoff
	SM param		-7.44	-6.82	-5.42	-0.77	0.90	2.74	4.51	3.31	0.09	-0.62	-5.33	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.90	2.74	4.50	3.31	0.09	0.00	0.00	0.00		93% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	0% recharge
1988			0.42	1.05	0.00	0.00	1.70	0.00	2.05	2.69	3.61	0.29	0.35	0.00		**14.11**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.15	0.02	0.00	0.00	**0.21**	1% runoff
	SM param		-8.95	-5.60	-5.70	-4.03	-0.73	-1.86	0.21	0.53	0.69	-4.08	-5.48	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.53	0.69	0.00	0.00	0.00		99% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	0% recharge
1989			0.00	0.00	0.65	1.50	0.18	0.28	5.05	4.53	1.51	1.27	1.45	0.46		**19.58**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.29	0.53	0.22	0.00	0.00	**2.04**	10% runoff
	SM param		-7.44	-6.82	-4.95	-2.29	-2.49	-1.54	3.69	6.14	2.22	-1.41	-4.21	-6.07		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.69	4.50	2.22	0.00	0.00	0.00		88% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0.00	0.00	**0.35**	2% recharge
1990			0.00	0.54	0.71	0.05	1.61	0.50	1.58	4.96	26.86	0.05	0.20	0.00		**42.99**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.14	0.02	0.00	0.00	**6.15**	14% runoff
	SM param		-7.44	-6.19	-4.88	-3.97	-0.83	-1.28	-0.34	2.95	30.08	-0.54	-5.66	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.95	4.50	0.00	0.00	0.00		40% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.45	0.00	0.00	0.00	**19.45**	45% recharge
1991			0.39	1.82	0.58	1.27	0.27	3.06	3.72	9.09	7.60	0.92	1.16	0.00		**34.66**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.49	2.70	2.64	0.32	0.04	0.00	**6.19**	18% runoff
	SM param		-6.99	-4.71	-5.03	-2.56	-2.39	1.69	3.83	11.58	9.29	0.47	-4.08	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	1.69	3.83	4.50	4.50	0.47	0.00	0.00		63% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.38	2.14	0.00	0.00	0.00	**6.52**	19% recharge
1992			0.00	7.26	0.00	2.52	0.00	9.17	32.93	14.48	3.70	0.00	0.43	1.42		**83.42**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	11.46	5.04	1.29	0.00	0.00	0.00	**17.79**	21% runoff
	SM param		-7.44	1.60	-4.10	-1.11	-2.70	8.78	40.53	18.50	4.76	-0.60	-5.39	-4.95		
	Soil Mo.	0.00	0.00	1.60	0.00	0.00	0.00	4.50	4.50	4.50	4.50	0.00	0.00	0.00		33% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	4.28	24.57	8.96	0.00	0.00	0.00	0.00	**37.80**	45% recharge
1993			0.00	0.00	0.00	0.44	3.24	1.97	1.49	10.21	4.65	2.16	0.24	0.00		**28.30**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.16	0.17	0.82	1.62	0.75	0.04	0.00	**3.56**	13% runoff
	SM param		-7.44	-6.82	-5.70	-3.52	1.06	1.48	1.04	10.09	5.86	1.91	-3.71	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	1.06	1.48	1.04	4.50	4.50	1.91	0.00	0.00		71% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.76	0.00	0.00	0.00	0.00	**4.76**	17% recharge
1994			0.00	0.09	0.00	0.57	1.52	1.67	20.29	7.03	19.22	1.83	1.17	1.22		**63.35**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.12	2.45	6.69	0.64	0.14	0.00	**10.03**	16% runoff
	SM param		-7.44	-6.72	-5.70	-3.37	-0.94	0.08	21.44	9.85	22.77	1.52	-3.01	-5.18		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	0.08	4.50	4.50	4.50	1.52	0.00	0.00		35% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	16.82	2.91	11.58	0.00	0.00	0.00	**31.31**	49% recharge
1995			0.62	0.00	0.00	0.00	0.11	3.40	3.41	9.15	5.27	1.32	0.00	0.00		**27.00**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.55	2.74	1.83	0.46	0.00	0.00	**5.58**	21% runoff
	SM param		-6.72	-6.82	-5.70	-4.03	-2.57	2.08	3.87	11.68	6.58	0.93	-4.96	-6.60		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	2.08	3.87	4.50	4.50	0.93	0.00	0.00		62% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.45	0.25	0.00	0.00	0.00	**4.69**	17% recharge
1996			0.08	0.16	0.00	1.50	8.29	4.83	4.51	1.15	0.00	0.20	0.07	0.09		**24.22**
	Runoff		0.00	0.00	0.00	0.00	0.00	1.68	1.57	0.40	0.00	0.00	0.00	0.00	**3.65**	15% runoff
	SM param		-7.35	-6.63	-5.70	-2.29	6.92	8.24	7.56	3.03	-1.00	-4.87	-5.81	-6.50		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	4.50	4.50	4.50	3.03	0.00	0.00	0.00	0.00		60% ET bal
	Recharge		0.00	0.00	0.00	0.00	2.42	2.06	1.49	0.00	0.00	0.00	0.00	0.00	**5.97**	25% recharge
1997			0.02	0.00	2.37	0.28	4.94	4.85	6.34	18.99	5.22	4.46	5.42	0.08		**61.45**
	Runoff		0.00	0.00	0.00	0.00	0.00	1.14	2.21	6.61	1.82	1.55	1.89	0.03	**15.23**	25% runoff
	SM param		-7.42	-6.82	-2.95	-3.71	3.03	6.80	9.68	23.73	6.53	4.57	4.90	-2.01		
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	3.03	4.50	4.50	4.50	4.50	4.50	4.50	0.00		48% ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	1.16	2.98	12.62	0.21	0.00	0.00	0.00	**16.97**	28% recharge
1998			0.00	1.16	0.61	0.11	3.59	1.40	1.41	1.05	1.20	5.06	0.01	0.43		**18.59**
	Runoff		0.00	0.00	0.00	0.00	0.00	0.16	0.13	0.06	0.00	0.00	0.00	0.00	**0.35**	2% runoff

	SM param		-7.44	-5.47	-4.99	-3.90	1.46	1.23	0.69	-0.89	-2.64	0.77	-5.11	-6.10			
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	1.46	1.23	0.69	0.00	0.00	0.77	0.00	0.00		98%	ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	0%	recharge
1999			0.88	0.00	1.00	0.00	0.17	0.33	1.53	10.95	3.69	2.45	0.10	0.00		**24.48**	
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.85	0.02	0.00	**2.15**	9%	runoff
	SM param		-6.42	-6.82	-4.54	-4.03	-2.50	-1.48	-0.40	9.90	4.75	2.24	-3.53	-6.60			
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50	4.50	2.24	0.00	0.00		69%	ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.40	0.00	0.00	0.00	0.00	**5.40**	22%	recharge
2000			0.00	1.64	1.07	1.40	0.81	0.05	2.69	9.72	2.15	3.82	0.09	0.00		**27.19**	
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.75	0.88	0.02	0.00	**2.35**	9%	runoff
	SM param		-7.44	-4.92	-4.46	-2.41	-1.76	-1.80	0.95	9.43	2.96	2.30	-3.49	-6.60			
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	4.50	2.96	2.30	0.00	0.00		76%	ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.21	0.00	0.00	0.00	0.00	**4.21**	15%	recharge
2001			0.05	0.01	0.02	0.00	2.14	2.49	1.00	0.00	2.33	1.12	0.00	0.00		**10.63**	
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	**0.08**	1%	runoff
	SM param		-7.38	-6.81	-5.68	-4.03	-0.22	1.03	0.02	-2.78	-1.33	-3.80	-5.89	-6.60			
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	1.03	0.02	0.00	0.00	0.00	0.00	0.00		99%	ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	0%	recharge
2002			0.00	0.00	0.55	0.18	5.08	5.79	0.52	8.86	6.25	3.70	2.03	0.00		**38.23**	
	Runoff		0.00	0.00	0.00	0.00	0.00	1.43	0.18	2.01	2.18	1.29	0.58	0.00	**7.66**	20%	runoff
	SM param		-7.44	-6.82	-5.06	-3.82	3.19	8.05	2.93	10.41	7.72	3.69	0.16	-6.44			
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	3.19	4.50	2.93	4.50	4.50	3.69	0.16	0.00		61%	ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	2.12	0.00	3.90	1.05	0.00	0.00	0.00	**7.07**	18%	recharge
2003			0.74	1.59	0.00	0.00	1.24	3.79	3.17	0.00	0.95	1.46	0.00	0.00		**15.01**	
	Runoff		0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.09	0.00	0.00	0.00	**0.71**	5%	runoff
	SM param		-6.58	-4.98	-5.70	-4.03	-1.26	2.54	4.04	1.24	-1.68	-3.41	-5.89	-6.60			
	Soil Mo.	0.00	0.00	0.00	0.00	0.00	0.00	2.54	4.04	1.24	0.00	0.00	0.00	0.00		95%	ET bal
	Recharge		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	0%	recharge
2004			0.10	0.21	0.00	13.96	2.92	9.98	18.22	13.70	3.61	2.22	0.44	0.00		**75.82**	
	Runoff		0.00	0.00	0.00	0.00	1.02	3.47	6.34	4.77	1.26	0.77	0.07	0.00	**17.69**	23%	runoff
	SM param		-7.32	-6.58	-5.70	12.16	5.19	14.22	23.47	17.59	4.66	1.98	-3.40	-6.60			
	Soil Mo.	0.00	0.00	0.00	0.00	4.50	4.50	4.50	4.50	4.50	4.50	1.98	0.00	0.00		31%	ET bal
	Recharge		0.00	0.00	0.00	7.66	0.00	6.24	12.62	8.32	0.00	0.00	0.00	0.00	**34.86**	46%	recharge

RECHARGE CALCULATIONS Recharge and Storage

SM capacity	4 50	inches			
runoff coeff	0 30	%	30 00	%	
					Storage Acft
storage Alluv	0 10		10 00	percent effective porosity	111 00
Alluvium Area	111 00	acres			
Sat d Alluvium	10 00	feet			
storage DG	0 05		5 00	percent effective porosity	538 00
DG aq area	538 00	acres			
DG sat_depth	20 00	feet			
storage frx	0 0005		0 05	percent eff porosity (500 ft deep)	713 50
WS aq area	2854 00	acres			
Eff capacity	681 25	Available Ac ft (50% allowed)			1362 50 total
Discharge rate	201 00	Ac ft/yr	124 60	in gpm (24 hr/day)	
			179 429	gallons per day	34 5 Average Annual Rainfall inches
min aquifer vol	3 51	Ac ft			8 205 Acft/yr in Watershed
avg aquifer vol	1269 49	Ac ft (of total)			2 4% GW Use es pct of rainfall

Alluv Storage	111 00	total Acft	55 50	allowed
DG storage	538 00	total Acft	269 00	allowed
Rock storage	713 50	total Acft	356 75	allowed
GW Storage	1362 50	total	681 25	total

Indicates Input Variables

Initial Volume	at beginning of calc period	340 63	3/4 full

YEAR	Year	ET	Runoff	recharge (inches) Recharge	adj. RF	recharge Ac-ft. (Rechge - pumping)	net pot'l inflow	start aquifer volume	end aquifer volume	recharge accepted (w/pumping)	pct accepted	recharge rejected Ac-ft/yr	inches/yr	Total Runoff inches/yr	pct of RF
1971 adj RF	1971	14.03	0.12	3.98	18.13	945.53	744.53	340.63	681.25	541.63	0.67	202.91	0.86	0.97	5.4%
runoff															
calc. parameter															
ET bal															
recharge															
1972	1972	20.24	9.78	12.03	42.05	2661.20	2660.20	681.25	681.25	201.00	0.07	2459.20	10.34	20.12	47.8%
1973	1973	17.24	1.50	0.00	18.75	0.00	-201.00	681.25	480.25	0.00	0.00	0.00	0.00	1.50	8.0%
1974	1974	26.51	3.37	3.38	33.26	803.17	802.17	480.25	681.25	402.00	0.50	200.17	0.84	4.21	12.7%
1975	1975	18.94	2.71	5.59	27.24	1328.92	1127.92	681.25	681.25	201.00	0.15	926.92	3.90	6.61	24.3%
1976	1976	29.68	1.91	1.99	33.58	473.14	272.14	681.25	681.25	201.00	0.42	71.14	0.30	2.21	6.6%
1977	1977	24.12	18.14	32.30	74.56	7681.68	7480.68	681.25	681.25	201.00	0.03	7279.68	30.61	48.75	65.4%
1978	1978	21.26	10.85	15.95	48.06	3792.86	3591.86	681.25	681.25	201.00	0.05	3390.86	14.26	25.11	52.2%
1979	1979	23.69	9.97	29.85	63.51	7098.86	6897.86	681.25	681.25	201.00	0.03	6696.86	28.16	38.13	60.0%
1980	1980	14.06	0.61	0.00	14.67	0.00	-201.00	681.25	480.25	0.00	0.00	0.00	0.00	0.61	4.2%
1981	1981	15.58	1.20	0.00	16.77	0.00	-201.00	480.25	279.25	0.00	0.00	0.00	0.00	1.20	7.1%
1982	1982	25.80	11.84	11.22	48.85	2667.50	2466.50	279.25	681.25	603.00	0.23	1863.50	7.84	19.47	40.0%
1983	1983	18.81	1.58	2.68	23.07	638.70	437.70	681.25	681.25	201.00	0.31	236.70	1.00	2.57	11.2%
1984	1984	22.77	4.80	4.29	31.92	1021.44	820.44	681.25	681.25	201.00	0.20	619.44	2.60	7.46	23.4%
1985	1985	18.25	1.54	1.18	20.96	279.50	78.50	681.25	681.25	201.00	0.72	0.00	0.00	1.54	7.3%
1986	1986	20.08	2.75	0.18	23.01	-42.82	-158.18	681.25	523.07	42.82	1.00	0.00	0.00	2.75	12.0%
1987	1987	20.51	1.63	0.00	22.14	0.00	-201.00	523.07	322.07	0.00	0.00	0.00	0.00	1.63	7.4%
1988	1988	13.90	0.21	0.00	14.11	0.00	-201.00	322.07	121.07	0.00	0.00	0.00	0.00	0.21	1.5%
1989	1989	17.19	2.04	0.35	19.58	83.44	-117.56	121.07	3.51	83.44	1.00	0.00	0.00	2.04	10.4%
1990	1990	17.39	6.15	19.45	42.99	4624.92	4423.92	3.51	681.25	878.74	0.19	3545.18	14.81	21.06	49.0%
1991	1991	21.95	0.19	6.52	34.66	1551.79	1350.79	681.25	681.25	201.00	0.13	1149.79	4.83	11.02	31.8%
1992	1992	27.83	17.79	37.80	83.42	8991.08	8790.08	681.25	681.25	201.00	0.02	8589.08	36.11	53.90	64.6%

1993	1993	19 98	3 56	4 76	28 30	1132 77	931 77	681 25	681 25	201 00	0 18	730 77	3 07	6 63	23 4%
1994	1994	22 01	10 03	31 31	63 35	7445 96	7244 96	681 25	681 25	201 00	0 03	7043 96	29 62	39 65	62 6%
1995	1995	16 73	5 58	4 69	27 00	1116 56	915 56	681 25	681 25	201 00	0 18	714 56	3 00	8 59	31 8%
1996	1996	14 60	3 65	5 97	24 22	1419 98	1218 98	681 25	681 25	201 00	0 14	1017 98	4 28	7 93	32 7%
1997	1997	29 24	15 23	16 97	61 45	4035 17	3834 17	681 25	681 25	201 00	0 05	3633 17	15 28	30 51	49 7%
1998	1998	18 25	0 35	0 00	18 59	0 00	201 00	681 25	480 25	0 00	0 00	0 00	0 00	0 35	1 9%
1999	1999	16 92	2 15	5 40	24 48	1284 78	1083 78	480 25	681 25	402 00	0 31	681 78	2 87	5 02	20 5%
2000	2000	20 63	2 35	4 21	27 19	1001 56	800 56	681 25	681 25	201 00	0 20	599 56	2 52	4 88	17 9%
2001	2001	10 55	0 08	0 00	10 63	0 00	201 00	681 25	480 25	0 00	0 00	0 00	0 00	0 08	0 7%
2002	2002	23 51	7 66	7 07	38 23	1680 45	1479 45	480 25	681 25	402 00	0 24	1077 45	4 53	12 19	31 9%
2003	2003	14 30	0 71	0 00	15 01	0 00	201 00	681 25	480 25	0 00	0 00	0 00	0 00	0 71	4 8%
2004	2004	23 27	17 69	34 86	75 82	8290 01	8089 01	480 25	681 25	402 00	0 05	7687 01	32 32	50 01	66 0%

APPENDIX F.
Groundwater Monitoring and Mitigation Plan

Appendix F
Groundwater Monitoring and Mitigation Plan

The Palomar Christian Conference Center is solely reliant on groundwater for domestic water requirements in an area with limited groundwater resources. Such use is contingent on the on-going implementation of a Groundwater Monitoring and Mitigation Plan (GMMP) that consists of the following requirements:

Groundwater Production and Water Level Monitoring

- Instantaneous flow flow meters shall be installed to monitor cumulative groundwater usage on all current wells (production wells 3 and 5) and future production wells.
- Groundwater production from the flow meters shall be monitored and recorded monthly in all production wells.
- Groundwater levels shall be measured monthly at wells 3, 4, and 5 for the first two years of groundwater production of site operations after build out is completed. At that time, pending an evaluation of the water level and pumping data base, water level measurement frequency may be reduced to every three months upon DPLU approval.

Whenever possible, groundwater production wells shall be de-activated for at least eight hours before measuring groundwater levels. Additionally, a repeat water level measurement shall be taken at a production well no sooner than five minutes after the initial measurement to assess how dynamic the water level is in the pumping well.

The facility shall track groundwater production over time and assess the rate of production compared to the annual production limit of 70 acre-feet per year to better assure deviations from anticipated water use are identified early and excess water demands reduced. The tracking shall be conducted bearing in mind that groundwater demand is expected to be highest during the summer months.

Groundwater Mitigation Criteria
The criteria for groundwater production monitoring shall be the annual groundwater production, from January 1 through December 31, shall not exceed a total production of 70 acre-feet per year. This limit does not include water used for fire protection during an emergency situation. No carry over of water not used from other years shall be permitted to occur.

If total groundwater production exceeds 59.5 acre-feet by November 1st, the following steps will be taken:

- Within seven days notify the Director of DPLU (the Director) via phone call and e-mail
- Rigorous conservation measures will be implemented including reduction of landscape irrigation

- Water production data will be collected twice a week
- A monthly report will be filed with the Director by the 5th of the following month to ensure compliance with these requirements

If total groundwater production exceeds 64.4 acre-feet by December 1st, the following steps will be taken:

- Within seven days notify the Director via phone call and e-mail
- Rigorous conservation measures will be implemented including elimination of landscape irrigation
- Water production data shall be collected twice a week
- Arrangements shall be prepared to provide domestic water to the facility via tanker truck on a temporary basis if groundwater production exceeds 67.2 acre-feet. The source of potable water shall either be from an imported water source or from a DPLU approved groundwater source. If implemented, this mitigation would not be expected to be either a long-term or an annual solution to a water budget deficit.
- A monthly report will be filed with the Director by the 5th of the following month to ensure compliance with these requirements.

If total groundwater production reaches 70 acre-feet prior to the end of the calendar year, the following steps will be taken:

- Terminate groundwater production at all wells
- Provide domestic water to the facility via tanker truck on a temporary basis until the beginning of the calendar year
- Evaluate the cause(s) of excess water demand and develop a plan to reduce water demand. Submit plan to the Director by January 21st of the new calendar year.

Reporting

Data from groundwater production and water level monitoring shall be submitted to DPLU annually. The monitoring report shall cover the period of January 1st to December 31st, and shall be due on January 21st. The report shall include a chart of groundwater production over time and water level hydrographs.

Future Production Wells

Any future water supply well locations shall be placed in locations that consider the potential for wastewater impacts as were historically noted to occur in existing well 1. Oversight shall be provided by the County of San Diego Department of Environmental Health (DEH). All future water supply wells installed are subject to well testing per DPLU guidelines and State Waterworks standards to assess whether adequate production exists to meet demand requirements of the facility. Additionally, groundwater production and water levels shall be recorded from any future production well.

It should be noted that this plan is separate and independent of any water quality reporting requirements required for the facility's DEH regulated water system.